United States Department of Agriculture

Sx^{w}uytn-Kaniksu Connections 'Trail' Project Environmental Assessment

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List of Abbreviations and Acronyms

The following list includes abbreviations and acronyms used through the document.

AQI	Air quality index
BA	Basal area – method of measuring tree stocking
BMP	Best management practice
BMU	Bear management unit (for grizzly bear)
BORZ	Bears Outside Recovery Zone – reflects grizzly bear management direction on the Idaho Panhandle National Forests
CFR	Code of Federal Regulations
CNF	Colville National Forest
CWPP	Community wildfire protection plan
DBH	Diameter at breast height – used for measuring tree size
DC	Desired condition – designation for Colville National Forest Land Management Plan component
DNA	Deoxyribonucleic acid – used to check for a species presence in an area
DNR	Department of Natural Resources
DxD DxP	Designation by description, Designation by prescription – methods used to define trees to be retained or removed during timber harvest
EA	Environmental assessment
EPA	Environmental Protection Agency
FRCC	Fire regime condition class – a measure of the degree of departure from the historic fire regimes
FVS	Forest vegetation simulator
FW	Forestwide - designation for Colville National Forest Land Management Plan component
GDL	Guideline - designation for Colville National Forest Land Management Plan component
GIS	Geographic information system
HRV	Historical range of variability
HUC	Hydrologic unit code – used for identifying watersheds
IDT	Interdisciplinary team
INFRA	Forest Service database used to track National Forest System infrastructure

Abbreviations and Acronyms

IPNF	Idaho Panhandle National Forests
ITM	Individual tree marking – method used to identify trees for removal during harvest operations
LiDAR	Light detection and ranging - a remote sensing method used to examine the surface of the Earth.
LMP	Land Management Plan
MA	Management area
NEPA	National Environmental Policy Act
NFS	National Forest System
OBJ	Objective - designation for Colville National Forest Land Management Plan component
OHV	Off highway vehicle – includes all terrain (ATV) and utility terrain (UTV) vehicles
PAG	Plant association group
PCE	Primary constituent elements - physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species
RMA	Riparian management area
SDI	Stand density index – used to measure tree stocking
SIO	Scenic integrity objective
STD	Standard - designation for Colville National Forest Land Management Plan component
TFPA	Tribal Forest Protection Act
TPA	Trees per acre – used to measure tree stocking
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WCF	Watershed condition framework
WUI	Wildland-urban interface

1.0 Introduction

The Forest Service is proposing ecological restoration activities on the Newport-Sullivan Lake Ranger District of the Colville National Forest (CNF). Proposed activities include vegetation and fuels restoration treatments, watershed and aquatic restoration treatments, sustainable management and maintenance of National Forest System (NFS) roads, wildlife habitat improvement, and management of recreation infrastructure.

The District prepared this environmental assessment (EA) to determine whether implementation of the proposed activities may significantly affect the quality of the human environment. This analysis is focused on measurement indicators connected to the purpose and need for action. Additionally, analysis was completed for other resources to help determine if effects from the proposed action would be significant. The preparation of this EA fulfills agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see Section 2.2.

1.1 Background

The Tribal Forest Protection Act of 2004[1] (TFPA), authorizes the Forest Service to give special consideration to tribal proposals for projects on lands administered by the Forest Service bordering or adjacent to tribal trust lands, or that pose a risk to trust assets. This unique legislation provides opportunities to reduce the risk of catastrophic fire; reduce potential for large-scale spread of insects, diseases, and invasive species; reduce other potential adverse effects to tribal lands; and to restore NFS lands.

Under this authority the Kalispel Tribe of Indians (Tribe) requested the Forest Service engage in a partnership to "advance our shared interest in ecosystem restoration, forest health, and hazardous fuels reduction on CNF lands adjacent to the Kalispel Indian Reservation". The Forest Service accepted the Tribe's proposal in a letter dated January 4, 2018. The Tribe refers to the project as Sx^{w}uytn, which is the Kalispel Salish word that roughly translates to connection or trail.

Other direction and authority come from the Colville National Forest Land Management Plan (USDA 2019), Washington Department of Natural Resources' (DNR) 20-Year Forest Health Strategic Plan for Eastern Washington[2] (Strategic Plan) and the Good Neighbor Authority[3].

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[1] Public Law 108-278: An act to authorize the Secretary of Agriculture and the Secretary of the Interior to enter into an agreement or contract with Indian tribes meeting certain criteria to carry out projects to protect Indian forest land.

[2] The Strategic Plan lays out a process for the DNR to strategically identify planning areas where state funding for forest health and restoration projects will be focused. Planning areas will generally be a HUC 6 watershed (5000 ~ 25,000 acres), but may be several watersheds in some cases.

[3] The Good Neighbor Authority is a tool stemming from the 2014 Farm Bill. This tool allows the DNR to hire and collaborate with local companies and interests to perform a variety of watershed, rangeland and forest restoration work across state and federal property lines, providing additive capacity to federal partners.

In the Strategic Plan, the DNR identified much of the 10 million acres of forest land in eastern Washington at a higher risk of damage by disease, insects and wildfire, and reduced ecosystem resilience due to decades of fire suppression and past management practices. Due to the juxtaposition of heavily mixed ownership within the project area, and reliance on partnerships with local land management agencies, forest collaboratives, tribes, and other stakeholders, the Sxʷuytn Project is a high priority area for treatment.

To facilitate a broader resource and social perspective, the interdisciplinary team (IDT) for the Sxʷuytn project was composed of NFS, Washington DNR, and Kalispel Tribe of Indians resource specialists.

1.2 Location of the Proposed Project Area

This area is located in Pend Oreille County in northeastern Washington State. The Sxʷuytn Project area extends from the CNF boundary four miles north of Newport through Exposure, Skookum, Cee Cee Ah, Cusick and Middle Creek watersheds. The Pend Oreille River and the Selkirk Divide/Idaho Panhandle National Forest bound the project on the west and east, respectively. The planning area is approximately 90,700 acres of which approximately 40,300 acres are managed by the CNF. Other land within the project area is managed by tribal, state, federal and private landowners (Figure 1). This document analyzes those actions proposed to be taken on NFS lands as well as the cumulative effects of other actions.

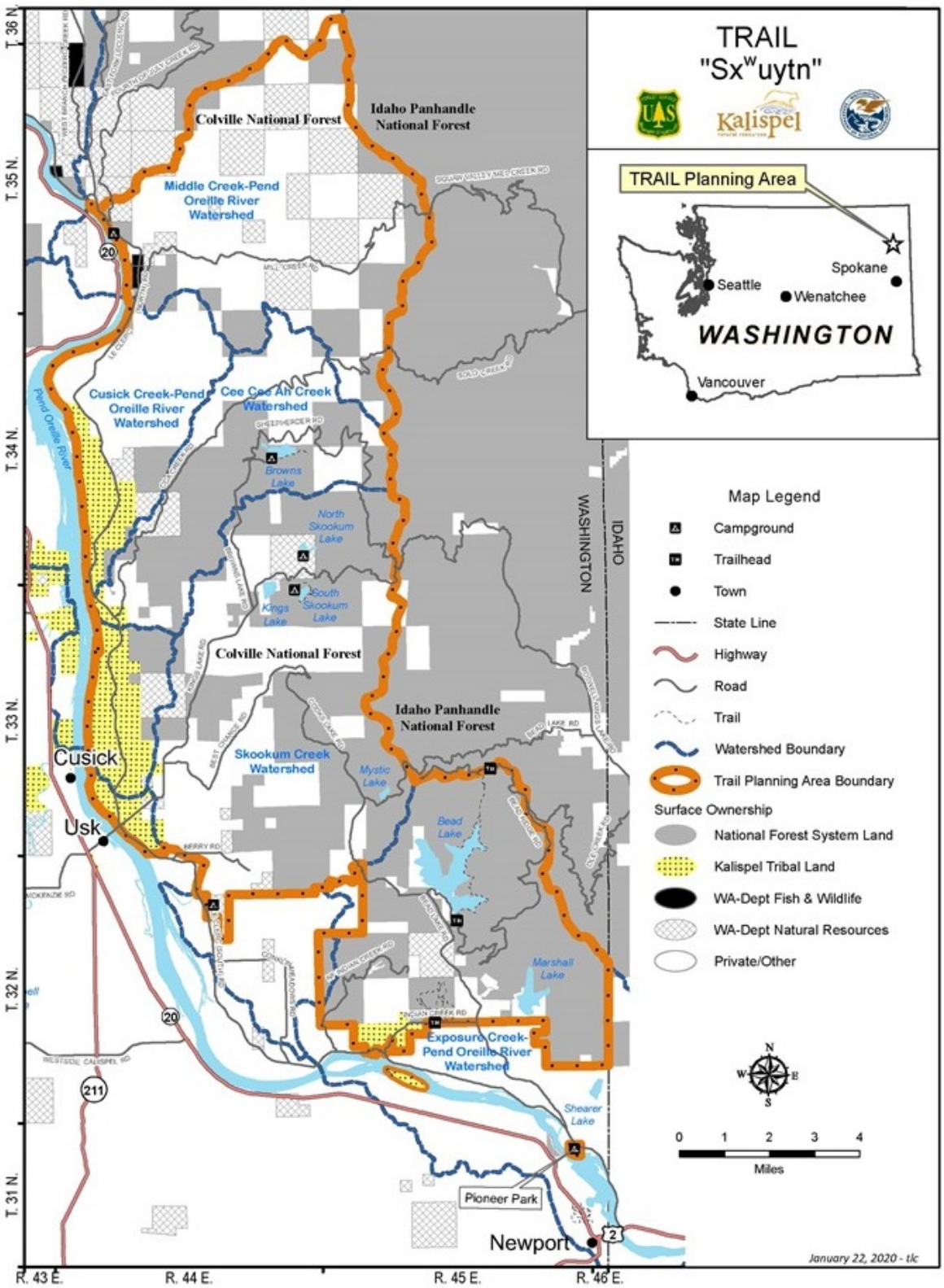

Figure 1. Sx^{w}uytn Kaniksu Connections 'Trail' project vicinity map

1.3 Purpose of and Need for Action

This project is needed to improve forest health and resilience to disturbance: address insect and disease outbreaks; reduce the potential for future outbreaks; limit the severity of wildland fires; meet state and federal water quality guidelines; provide quality aquatic and wildlife habitat; contribute to the local economy; and connect people to their landscapes. The project's proposed action is based on direction in the CNF Land Management Plan (Forest Plan, 2019) as well as consistency with the Pend Oreille County Community Wildfire Protection Plan[4] (CWPP, 2005 as amended).

The following objectives were developed to address the need for action.

Objective 1: Trend the forest to the historic range of variability, reduce hazardous fuels and improve resilience to disturbance

High-density forest conditions dominate the planning area. These density conditions generate severe competition between trees, reduced tree vigor, increased tree mortality and above normal buildup of dead, woody biomass (fuel) on the forest floor. Dense forest conditions throughout the planning area reduce the resilience of these forests to disturbance and contribute to uncharacteristic fire severity.

- Trending the forests to their historic range of variability (e.g., changing stand structure to increase patch sizes, tree diameter, age, spacing and species composition; reducing competition).
- Improving forest resiliency to such factors as fire, drought, insects, and diseases (e.g., reducing fuels, reducing stocking density, and increasing biodiversity).

Objective 2: Improve water quality and aquatic/riparian habitat conditions

Some roads in the project area are contributing to loss of aquatic system integrity. In addition, riparian management areas are now at higher than historic levels of risk for severe wildfire because of drier conditions in the surrounding vegetation. Treatment is needed to reduce severe wildfire risk and loss of adjacent vegetation which could lead to increased sedimentation.

- Improving or maintaining water quality (e.g., reduce sedimentation rates into streams, facilitate achieving desired water temperature).
- Improving aquatic and riparian habitat conditions (e.g., support native aquatic- and riparian-dependent plant and animal species, distribution of conditions is similar to reference condition watersheds, hydrologic connectivity, and sediment regime is within the natural range of variation).
- Providing aquatic organism passage.

[4] The Community Wildfire Mitigation Plan for Pend Oreille County, Washington, is the result of analyses, professional cooperation and collaboration, assessments of wildfire risks and other factors considered with the intent to reduce the potential for wildfires to threaten people, structures, infrastructure, and unique ecosystems in Pend Oreille County, Washington. More information can be found at https://www.dnr.wa.gov/Publications/rp_burn_cwpppendoreille.pdf

Objective 3: Improve habitat conditions for big game and federally protected wildlife species

Habitat for big game and federally protected species can benefit from reducing open road density and improving the amount and quality of available forage, prey habitat and security.

- Improving habitat conditions (e.g., amount, distribution, and connectivity of habitat, forage availability, seclusion) for big game, surrogate species, and federally protected species such as grizzly bears.

Objective 4: Provide opportunities for members of the public to connect to the landscape and for projects that can contribute to the local economy

There is an active public interest in the recreational and economic value of the Sxʷuytn project area.

- Continuing to provide opportunities to contribute to the local economy (e.g., jobs, forest products, recreation).
- Providing opportunities for connecting people to their land (e.g., recreation, interpretation, citizen science, and maintaining access to traditional cultural resources).

Background information supporting the need for the proposal can be found in specialist reports which are incorporated into this EA by reference. These reports are available in the project record at the Newport-Sullivan Lake Ranger District office in Newport, Washington, or on the project website (https://www.fs.usda.gov/project/?project=54315).

1.4 Management Direction

The Colville Forest Plan (2019) is the guiding management direction for the Sxʷuytn Project. This EA incorporates the Forest Plan by reference and is tiered to the Forest Plan's Final Environmental Impact Statement (USDA Forest Service 2019). Direction for each management area (MA) is provided by the Forest Plan, which describes the goals, objectives, standards, guidelines, and management prescriptions (Forest Plan Chapter 3). The emphasis of each MA within the project area is listed in Table 1. No federal actions are proposed on any non-NFS lands.

Table 1. Forest Plan Management Areas

Management Area*	Acres (nearest 100)	Percent of Project Area (NFS acres)	Forest Plan Emphasis
Backcountry	< 100	< 1%	summer and winter non-motorized recreation opportunities
Focused Restoration	19,500	48%	restore ecological integrity and ecosystem function at the landscape scale
General Restoration	20,500	51%	includes all areas not included in another management area
Scenic Byways	300	1%	protect the scenic values and recreation use and have a high scenic integrity objective
Total	40,300	100%	

*Administrative and Recreation Sites and Riparian Management Areas are also found within the project area but they overlap the other management areas, so acres associated with them are not included in the total above. Where management areas overlap, the most restrictive Forest Plan direction applies depending on site-specific conditions and the activity or use.

1.4.1 Travel Analysis

Travel analysis of the project area to determine the sustainable road system needed for safe and efficient travel and administration, utilization, and protection, of NFS lands follows 36 CFR 212 subpart B[5], Forest Service Manual 7710.3 and Forest Service Handbook 7709.55. The direction identifies opportunities for the national forest transportation system to meet current and future management objectives, and to provide information that allows integration of ecological, social and economic concerns into future decisions.

The project area contains over 440 miles of National Forest System, non-System, state and county roads, the majority of which were designed for timber harvest and removal or access to privately-owned lands.

The Sxʷuytn Transportation Analysis (Cook, 2020) and documents are located in the project record.

1.5 Scope of Environmental Analysis / Issues

The responsible official and the IDT reviewed and analyzed the environmental and social effects of proposed actions in context of Forest Plan direction, public scoping comments and the existing conditions information. The analysis was focused on the effects of the proposed actions

[5] Subpart B provides for a system of NFS roads, trails and areas of NFS lands that are designated for motor vehicle use. The Motor Vehicle Use Map (MVUM) is produced under subpart B 212.51 and displays the NFS roads, trails and areas on NFS lands that are designated for motor vehicle use.

and if they met the objectives defined by the purpose and need, as described in Section 1.3. Additionally, analysis was completed for other resources (summarized in Section 3.0) to help determine if effects from the proposed action are significant.

2.0 Proposed Action and Alternatives

This project was developed in coordination with the Kalispel Tribe, Washington DNR, members of the public, county leaders, and a local collaborative group (Northeast Washington Forest Coalition). In addition, the Forest worked with other local Tribes and interest groups. As a result, a single proposed action was developed for the Sxʷuytn Project. This section outlines project design elements that have been built into the proposed action to ensure compliance with Forest Plan standards and guidelines, laws, regulations and other policies. It also includes design elements included to minimize potential resource impacts from project implementation.

2.1 Alternatives Considered but Eliminated from Detailed Study

Three potential alternatives were proposed by the public during the January/February 2020 scoping period. After review by the IDT and the responsible official, it was determined that these alternatives would not be analyzed in detail.

Road Management (keep existing road system)

Several members of the public proposed an alternative that did not close any additional roads to public use nor decommission any NFS roads. During analysis of the road system the IDT reviewed existing use, current condition, need for access, maintenance needs, and impacts to natural resources for each road within the project area. Roads proposed for closure or decommissioning do not impact availability of access for harvest, fuel treatment, emergency responder access (e.g., law enforcement, wildfire response, search and rescue), access to designated recreation sites, or designated motorized or non-motorized trails. Removal of the roads from the Forest system and rehabilitation of the roadbed would improve aquatic and terrestrial habitat and reduce road maintenance costs. Although leaving these roads on the system would allow the project to meet objectives 1 and 4, it would no longer meet the aquatics or wildlife objectives of the Purpose and Need (EA Section 1.3). Therefore, this alternative was not analyzed in detail.

Road Management (reduce existing road system; no new system or temporary roads)

Input from the public during the scoping period included an alternative that follows restoration and proforestation[6] principles, preserves at least half of the project area as intact forests and unroaded areas, results in a road system which is fully affordable to maintain on an annual basis, would reduce the road network in the project area watersheds consistent with the Forest Plan, and would not construct any new roads, including temporary roads.

[6] Proforestation - refers to the practice of protecting existing natural forests from human disturbance; or growing existing forests as intact ecosystems

- *Preserving one-half of the project area as unroaded areas:*

  This would not meet the management area direction in the Forest Plan, nor would this meet the purpose and need for the Sx^{w}uytn project to trend the forest to the historic range of variability, reduce hazardous fuels and improve resilience to disturbance (objective 1) or provide opportunities for members of the public to connect to the landscape and projects that can contribute to the local economy (objective 4).

- *Reduce road system to fully affordable level:*

  Maintenance, resource and public access needs were reviewed during the IDT review of the road system located within the Sx^{w}uytn project area. Road closure and decommissioning proposals meet Forest Plan direction to move the project area toward road density goals (Objectives 2 and 3). Full reduction of road density to Forest Plan desired condition levels would impact access to other ownerships and reduce access to recreation opportunities (Objective 4).

- *Do not construct any new system or temporary roads:*

  If commercial harvest units currently proposed for access by new system or temporary roads were retained in the proposed action, the cost of associated treatments would increase management costs significantly (harvest system would move to more expensive options such as helicopter operations; more labor intensive work for post-harvest treatments such as fuel treatments) and reduce economic feasibility of completing the harvest and post-harvest treatments. This would not meet Purpose and Need objective 4 (provide opportunities for members of the public to connect to the landscape and projects that can contribute to the local economy) and reduce ability to meet objective 1 (trend the forest to the historic range of variability, reduce hazardous fuels and improve resilience to disturbance).

  Removal of units no longer economically viable or that would no longer be able to be treated could reduce commercial management opportunities (vegetation and fuels) by approximately 34% and reduce non-commercial fuel treatments by approximately 20%.

Since this alternative would not meet Forest Plan direction, nor would it meet Purpose and Need objectives 1 and 4, this alternative was not analyzed in detail.

Create a Restoration Forest Reserve

An alternative received from the public during the scoping period asked the Forest to 'rewild' part of the project area. The alternative would designate a forest preserve encompassing the drainages on the north and east side of Bead Lake that eliminated roads, prohibited harvest activities, and reintroduced fire.

Implementing this proposal would not meet the purpose and need for this project (EA Section 1.3) to address wildland fire risk and improve resilience to disturbance as some of the areas proposed for 'rewilding' are identified as areas outside historic range of variability for vegetation structure and are at a greater risk for higher severity wildland fire (Pend Oreille County CWPP). Designation of a forest preserve does not meet the Forest Plan direction for Focused Restoration (CNF Management Plan, pages 106-108) or General Restoration (CNF

Management Plan, pages 109-111). Implementation of this proposal would require creation of a new management area and a Forest Plan amendment.

Since this proposal would not meet Forest Plan direction, and would not be consistent with the Pend Oreille County Community Wildfire Protection Plan (2005 as amended), this alternative was not analyzed in detail.

2.2 Proposed Action

An IDT that incorporated specialists from the Forest Service, Washington Department of Natural Resources, and Kalispel Tribe of Indians, reviewed the project area and identified potential opportunities for actions in the Sxʷuytn project area. These opportunities were presented and discussed at several public workshops, as well as with Pend Oreille County Commissioners, Northeast Washington Forest Coalition, and recreation users and groups, to aid in identifying and addressing public concerns and issues. Input from the workshops, meetings, and letters received during the public scoping period, was considered by the responsible official and IDT and used to develop the proposed action.

Maps showing the proposed action can be found in Appendix A. Tables 2, 3 and 4 present a summary of the proposed treatments. Treatments may overlap on some of the acres (e.g., fuel treatment occurring in the same area as commercial harvest). Therefore, adding the acres from all of the proposed actions listed in the following tables would not reflect the actual total acres that would have some type of treatment. Accounting for the overlap of treatments, a total of approximately 36,400 acres within the project area would be treated.

Information about the workshops, meetings, and public scoping can be found in the project record.

Table 2. Restoration activities - commercial

Management of (primarily) the tree component over the landscape to address historical range of variability (HRV), insect and/or disease concerns, reduce fuel levels and risk of uncharacteristic wildfires (numbers are rounded to the nearest percent or nearest 100 acres). Proposed commercial treatment areas could include a mix of activities (e.g., an individual unit might include both commercial thinning and group selection).

Treatment Activity	Estimated Quantity	Definition
Commercial thinning	8,800 acres (36%)	An even-aged harvest method that removes suppressed, intermediate, and codominant trees. However, some dominants may be removed to meet stand density targets or create a desired species composition.

Treatment Activity	Estimated Quantity	Definition
Shelterwood with Reserves	6,800 acres (28%)	A regeneration harvest method that removes trees except those needed for regeneration purposes. Prepares the seed bed and creates a new age class of trees. Reserve trees would be retained to create a two-aged or multi-aged stand of a desired species composition. Additional live trees would be retained for reasons other than regeneration, such as trees exhibiting signs of wildlife use or unique late structure. Areas would be evaluated to determine if natural regeneration would need to be supplemented with planting seedlings.
Group selection	8,800 acres (36%)	An uneven-aged regeneration method in which trees are cut in small groups where new age classes are established. These openings may contain clumps or individuals of desirable seed trees which make the contiguous group selection areas smaller than 3 acres, on average. Commercial thinning would occur between the group selection areas. Multiple entries would ultimately result in an uneven-aged stand of 3 or more age classes. Initial cutting would likely result in a two-aged stand structure. Areas would be evaluated to determine if natural regeneration would need to be supplemented with planting seedlings.
Total commercial treatment	24,400 acres	

Table 3. Restoration activities – non-commercial, vegetation (acres)

Management of (primarily) non-commercial size trees (such as saplings), shrubs, slash and other fuels, etc. to address insect and/or disease concerns, help develop stands to meet HRV, reduce fuel levels and risk of uncharacteristic wildfires, and improve wildlife habitat. These activities include acres both within and outside proposed commercial units (rounded to the nearest 100 acres).

Treatment Activity	Estimated Quantity	Definition
Precommercial thinning	8,100	The cutting of trees to reduce stocking density, change species composition, increase growth and improve forest health. Residual trees are typically western larch, white pine, ponderosa pine, and Douglas-fir, though other species may be left.

Treatment Activity	Estimated Quantity	Definition
Prescribed burn, natural fuels units	4,500[7]	Use prescribed fire to reduce the risk of uncharacteristic wildfires. The intent would be to reduce surface fuels, stand understories and fuel ladders; raise the live crowns of overstory trees; promote the growth of fire-adapted tree species; and rejuvenate grasses and desirable browse species for wildlife.
Prescribed burn, commercial restoration units	6,500	Use prescribed fire to reduce logging slash, remove undesirable regeneration, promote the growth of fire-adapted tree species, and rejuvenate grasses and desirable browse species for wildlife.
Whip felling	15,000	Removal of sapling and pole size trees damaged during commercial harvest or displaying insect or disease concerns.
Mechanical Piling & Pile Burn	8,400	Piling of harvest slash to reduce surface fuels or enhance regeneration. Piles are subsequently burned if they cannot be utilized for commercial or other purposes.
Mastication	800	Mechanical shredding of unwanted vegetation (shrubs, small trees) and scattering material along the forest floor.
Riparian management area[8] (RMA) thinning	2,100	Thinning of trees within the RMA to increase growth and canopy cover of residual trees over time and provide future coarse woody material to streams.
Total non-commercial vegetation treatments	45,400 acres	

Table 4. Restoration activities - other non-commercial

These are activities that are not necessarily vegetation-based (rounded to the nearest 10 acres or nearest mile for most proposed activities).

Treatment Activity	Estimated Quantity	Definition
Large woody material placement	730 acres	Placement of large logs or root wads in stream systems to improve aquatic habitat.

[7] The acre total in the proposed action includes both the fuels treatment and habitat enhancement acres that were provided during the public scoping period. Due to similar type of method, season of implementation, and adjacency and overlap of treatment areas, the IDT and district ranger felt combining the two activities into one line-item better reflected the overall proposed activity.

[8] Riparian area: A transition area between the aquatic ecosystem and the adjacent terrestrial ecosystems identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

Treatment Activity	Estimated Quantity	Definition
Culvert replacement or removal	40 culverts	Culverts on NFS roads that do not currently meet the requirements for aquatic organism passage would be removed or replaced. Additional culverts may also be replaced if identified in the area.
Stream crossing restoration (non-system roads)	50 acres	Existing stream crossing structures on unauthorized roads in proposed treatment unit RMAs would be removed and the stream channel stabilized and recontoured to mimic the adjacent natural topography. Estimated at approximately 0.1 acre of restoration per crossing.
Hydro-stabilize system roads	60 miles	Road storage and stabilization treatments to avoid, minimize, or mitigate adverse effects to water quality, aquatic habitat, and riparian resources. Hydrologically stabilized roads minimize road erosion and road hydrologic connectivity to the stream network.
Wetlands restoration	26 acres	Improve water quality and wetland habitat where past management altered the hydrology and lowered the water table. Actions may include conifer removal, soil decompaction, invasive species removal, and removal of old water diversions.
Create den sites for lynx and other rare forest carnivores	10 structures	In multi-storied stands on the lynx range, provide micro-sites of concealing cover for rare forest carnivores. Create log piles consisting of at least 3-5 layers of larger (9-14 inch) logs crisscrossed or lain lengthwise in triangular groupings of 3 logs. Cover the top with a few layers (about 2-3 feet) of branches and other small material.
Herptile Structures	5 structures	Install down logs on the margins of ponds or wetlands, partially in open water. The intent would be to provide loafing sites for turtles and cover for amphibians.
Bear habitat improvement	10 cans	Replace existing, conventional garbage cans with animal-resistant cans at the WA DNR North Skookum Lake Campground.
Loon platform creation	2 structures	Install artificial floating nest platforms for loons on Bead and Marshall Lakes.
Information board	1 structure	Replace existing 1-panel information board with a 2-panel information board at Marshall Lake.

Treatment Activity	Estimated Quantity	Definition
Non-motorized trail construction	7 miles	• Build a new trail off the Bead Lake – Lodge Creek Trail (#127) around the northern and western ridge of the lake basin (~4.8 mi) & add points for vistas • Connect the dead-end spur of the Bead Lake Trail to the new loop to provide an additional route (Bead to Ridge trail; ~1.8 mi) • Connect Geophysical to Indian Creek Community Forest (<1 mi)
Trailhead construction	1 trailhead	Construct a trailhead along the north side of Bead Lake Loop trail near No Name Lake Campground.
Convert existing road status to "Road Open to All Vehicles"	19 miles	• Open Browns Lake Road (NFS 5030) from the junction of Browns Creeks Road (NFS 1921) to the junction of Sheepherder Road (NFS 5080) (~0.3 mile) • Open Browns Creek (NFS 1921) and CeeCeeAh (NFS 1920) roads to OHV use to provide connectivity to open IPNF routes (~14 miles) • Open Cooks Lake Road (NFS 5015) to connect Bead Lake (CR 3129) and Best Chance (CR 3407) roads (~5 miles)
New motorized (OHV) trail construction	1 mile	Construct trail along southwest side of Bead Lake (between trailheads) to move OHV use off County Road 30290 and to keep a loop route
Open campground to OHV use	1 campground	Open Cooks Lake campground to OHV use.
Bead Lake boat launch dock	1 dock	Add a small dock adjacent to the Bead Lake boat launch for safety and making boat launch easier.
Parking expansion	2 parking areas	Enlarge Bead Lake boat launch parking area to accommodate pickup trucks with attached trailer. Enlarge the entrance to Mill Creek Road (NFS 1200) to provide additional parking spaces for trucks with trailers.
System Roads[9,10] (miles)		
New construction	6	Road segments that are expected to be located on previously disturbed soils (there is an existing roadbed) ~2 miles Road segments that are expected to require creation of new roadbed ~4 miles

[9] Definitions for road management designations are located on the Colville National Forest website (https://www.fs.usda.gov/project/?project=54315)

[10] Management proposal by individual system road is located in Appendix D.

Treatment Activity	Estimated Quantity	Definition
Road decommissioning	51	Removal of NFS roads through stabilization, recontouring, and revegetation activities. • Currently closed roads = ~46 miles (~16% of NFS roads in the project area) • Currently open roads = ~5 miles (~2% of NFS roads in the project area)
Road converted to trail	3	Convert from existing closed system road to non-motorized trail.
Close to non-administrative use	2	Close a road to public motorized access to protect wildlife habitat or update designation in Forest database for a road that is already undrivable.
Temporary Roads (miles; NFS lands)	51	Road segments that are expected to be located on previously disturbed soils (there is an existing roadbed) ~25 miles Road segments that are expected to require creation of new roadbed ~26 miles
Rock Pits	18 acres	Up to two (2) sites may be located and utilized for each zone (northern, central, and southern parts of the project area), with a maximum size of three (3) acres per site, and if possible, an existing site would be used and expanded rather than create a new site.

2.3 Design Elements in the Proposed Action

The design elements listed in Table 5 are specific to this project. Standard practices that would also apply to project implementation are in Appendix B-Standard Practices.

Table 5. Project Design Elements (DE)

Nbr	Resource	Design Element	Locations Units/Roads
DE-1	Recreation	**Dispersed Recreation Sites** High-value dispersed recreation sites identified and mapped by the District Recreation Specialist should be treated to enhance the long-term health and sustainability of the vegetation (overstory as well as understory) within the immediate foreground zone (0-300 feet) of each dispersed recreation site so that shade, screening and dust control are provided while also meeting the scenic integrity objective associated with each high-value dispersed recreation site.	High-value recreation sites
DE-2	Scenic	**Scenic Travel Routes** Maintain high scenic quality settings along the foreground and middle-ground distance zones of designated scenic travel routes used for year-round recreation. Manage the foreground (up to ½ mile distance zone or seen area) to minimize visual impact of vegetation and fuels reduction activities and provide a roaded natural experience. Scenic Integrity Objectives (SIOs) for Moderate or High. Repeating form, line, color, texture, pattern, and scale common to the valued landscape character being viewed is the most effective way to maintain scenic integrity in the High and Moderate Scenic integrity Objective Levels.	Applies to High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, Kings Lake C-3389 Moderate SIO: Bead Lake C-3029, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-3	Scenic	**Scenic Travel Routes** Enhance landscape character by increasing vegetation variety by promoting different age classes of tree species, and thinning to expose large Ponderosa pine and Douglas-fir boles and fall colors of western larch stands for viewing along the travel routes. Leave clumps of varying sizes of overstory and understory along the foreground of travel routes and trailside zones. Use irregular clumping and feathering of unit edges to avoid introducing lines that could result from unit edges.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3029, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015

Nbr	Resource	Design Element	Locations Units/Roads
DE-4	Scenic	**Scenic Travel Routes** In areas with Moderate or High SIOs prescribed, cut stumps of all size classes low as feasible unless otherwise unattainable due to environmental or safety concerns. *In Summer logging operations, cut stumps less than 8 inches on the high side of the stump within 100 feet of scenic travel routes. *In Winter logging operations, cut as low as possible, minimum 12" height.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3029, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-5	Scenic	**Scenic Travel Routes** Landings location and slash treatment: Minimize visual effects of landings and slash debris once the project is complete. Where feasible, slash piles and log landings would not be located within the immediate foreground (300') or seen area as viewed from scenic travel corridors and system trails. Where possible, leave vegetative screening between landings and slash burn piles and foreground zones of travel routes. If vegetative clearing is needed, shape edges of landings to mimic natural patterns and openings. Clear slash and debris in landings and revegetate with native species. Landings and skid trails: Reclaim and rehabilitate impacted portions of these areas to facilitate rapid recovery and prevent future visible erosion and non-native invasive plant infestation.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3029, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-6	Scenic	**Scenic Travel Routes** Evidence of activities which are temporary in nature (such as staking, paint, flagging, equipment maintenance, and/or staging areas) should occur at the minimum level needed and should be removed or cleaned up immediately following project completion. Develop marking guidelines to minimize the amount of paint seen from areas of scenic concern. Designate trees for removal without marking (DxD or DxP) or paint using individual tree marking (ITM)	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3029, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-

Nbr	Resource	Design Element	Locations Units/Roads
		so paint would be removed with the tree when harvested in commercial thin units.	3318, and Cooks Lake FR 5015
DE-7	Scenic	**Scenic Travel Routes** Management practices which create openings should: - Retain reserve islands and clumps in openings that may exceed 5 acres; - Retain single trees in the immediate foreground to frame views; - Retain single trees along the edge of the opening where existing vegetation provides a backdrop; - Highlight character trees such as large diameter trees, - Feather heights of clearing edges; leave full-crowned trees. -Shape temporary and permanent openings to have a natural appearing configuration; -Use irregular clumping and feathering of unit edges to avoid introducing dominating lines that could result from creating openings. In areas designated to Low Scenic Integrity Objectives, strive to maintain a combination of mosaic and uniform (open) spaces and retain color and texture in the landscape.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3029, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-8	Scenic	**Scenic Travel Routes** Methods used to control prescribed burns should not dominate the naturally established form, line, color and texture of the landscape area in scenic viewsheds. Minimize dozer lines and do complete rehabilitation when done, utilize natural features and existing roads as breaks. Locate furrows, trenches and hand lines to reduce linear appearance as viewed from recreation use areas.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3429, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015

Nbr	Resource	Design Element	Locations Units/Roads
DE-9	Scenic	**Scenic Travel Routes** In seen areas, snags and cavity trees should be grouped with reserve islands. If single trees are reserved, they should be within 200 feet of the edge of existing vegetation. Single trees in the immediate foreground generally should be greater than 10 inches dbh.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3429, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-10	Scenic	**Scenic Travel Routes** For obliterations of temporary roads: - Use positive signing and/or natural appearing barriers such as rocks, logs, or berms to effectively block roadway and allow revegetation. If signing is used, remove once evidence of road is no longer present. - Round slopes to approximate original contour. - Scarify roadbed to ensure natural revegetation is established in 2 years and seed with native grass seed mix. - Allow for natural revegetation (ensure natural revegetation is established within 10 years).	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3429, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-11	Scenic	**Scenic Travel Routes** Treatment of activity fuels and slash treatment along the foreground viewing area of roads and systems trails: -No activity fuels would be allowed to remain on or within the roadway or system trailside zone; -The amount and location of residual slash within vegetation harvest units should strive to minimize potential impacts to road and system trailside zones; -Additional slash mitigation such as piling or pulling back the slash would be required where residual slash exceeds 6 inches in depth over an area greater than 100 square feet if it is located within 100 feet of road and system trails.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3429, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015

Nbr	Resource	Design Element	Locations Units/Roads
DE-12	Scenic	**Scenic Travel Routes** For opening roads and constructing new or temporary roads: Leave large trees and clumps of vegetation below the road prism on downhill side to provide vegetative screening as viewed from a distance.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3429, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-13	Scenic	**Scenic Travel Routes** If skyline harvest systems are used, locate skyline corridors at angles to avoid linear effect viewed from scenic travel corridors, Bead Lake, and all developed recreation sites. Use irregular clumping and feathering of skyline corridor edges to avoid introducing dominating lines. If logging feasibility assessment during pre-sale design indicates this direction cannot be met, alternatives would be discussed with scenic resource specialist and an agreement reached contingent upon approval of the district ranger.	High SIO: Bead Lake C-3029, Le Clerc South C-9305, Le Clerc North C-9325, Brown Lake FR 5030, and Kings Lake C-3389 High to Moderate SIO: Bead Lake C-3429, Boswell Kings Lake FR 5000, Best Chance C-3407, South Baldy FR 5080-306, Bear Paw C-3318, and Cooks Lake FR 5015
DE-14	Sensitive Plants	**Sensitive Plant Protection** Ground disturbance would be avoided within 150 feet of known crenulate moonwort *(Botrychium crenulatum)* populations.	Units 76, 394, 953
DE-15	Special Uses	**Road Easement Impacts** Road easement authorization holders would be notified in advance if project operations result in temporary road closure or travel delay.	Units accessed by NFS roads 1900125, 1934202, 1934204, 1900750, 3200073, 3200152, 5000550, 5000998, 5000999

Nbr	Resource	Design Element	Locations Units/Roads
DE-16	Special Uses	**Geophysical Observatory** Timing of project activities within ¼ mile of the USGS[11] Geophysical Observatory would be coordinated with USGS no less than two weeks in advance so that they can calibrate their data with anticipated effects.	Units 447 and 448
DE-17	Wildlife	**Lynx Habitat Components:** Closed canopy, multi-storied timber stands are rare on the lynx range. Retain these stands unless they are at imminent risk of being lost to insects, disease or senescence. There is a surplus of recently created openings on the lynx range, reducing habitat connectivity for lynx over the short to mid-term. Create no additional forest openings on the lynx range with this project.	Mapped lynx range within the Sx^{w}uytn Project area
DE-18	Wildlife	**Goshawk Nest Surveys:** Complete surveys for active goshawk nests at least one nesting season prior to the start of each new project implementation phase or timber sale. Active nests are typically spaced 2-4 miles apart from each other on the landscape.	Mid- and late-closed stands in the project area
DE-19	Wildlife	**Raptor Nesting Habitat:** Vegetation management within mapped "primary" goshawk habitat (e.g., active nest stands, replacement nest stands, and potential habitat in the mesic vegetation types) would occur only as necessary to maintain desired habitat conditions for goshawks, as determined by the wildlife biologist. Within mapped "secondary" goshawk habitat (e.g., potential habitat in the Douglas fir-dry vegetation type), retain resource values for goshawks in harvest units such as large trees, tree clumps, and more than 50% canopy closure overall.	Mapped primary and secondary habitat for goshawks
DE-20	Wildlife	**Raptor Nesting Habitat – Bald Eagle:** Complete no timber harvest or prescribed burning between the LeClerc Road (County Road 1900) and the Pend Oreille River, within 300 feet of the Mill Creek bald eagle nest.	Unit 12 (Mill Creek bald eagle nest)

[11] USGS = United States Geological Survey

Nbr	Resource	Design Element	Locations Units/Roads
DE-21	Wildlife	**Raptor Nest Disturbance:** Protect active nests from human disturbance. Conduct no project activities within 0.25 mile of active nests during the following nesting and fledging periods: bald eagle: January 1 - August 15 goshawk: March 1 - August 31 Cooper's hawk: April 1 - August 31 flammulated owl: April 1 - July 15 Timing restrictions could be adjusted by the district wildlife biologist based on site-specific conditions.	Units 12, 13 (bald eagle) Units 265, 267, 269 (King's Lake), 468, 470, 471 (Vanes Lake),528, 531, 532 (Bead Lake) (goshawks) Units 238, 239, 244 (Cooper's hawk) Units 352, 354, 495, 497, 498, 557 (flammulated owl)
DE-22	Wildlife	**Bat Habitat Disturbance** Do not complete harvest operations within 0.25 mile of abandoned mines from September 15 to May 15 to avoid disturbance to bats at potential hibernacula. Do not use or allow prescribed fire within 400 feet of abandoned mines unless they are determined to be unoccupied by bats.	Units 529, 533, 534 (Bead Lake Mine) Units 228, 230, 231, 232, 234 (Half Moon Lake Mine)
DE-23	Wildlife	**Disturbance to Wintering Deer and Elk** On road systems that are annually closed during the big game wintering period (December 1 to March 31), complete no timber harvest, log hauling, or other project activities during the closure period.	Winter range road closures include: - FR 1914 (Furport Road) - FR 1900016 (CCA Creek) - FR 1900041 (Sandwich Creek) - FR 500032 (Papoose Road)
DE-24	Wildlife	**Trails** A wildlife biologist would be consulted in the design and siting of any new trails. To the extent feasible, new trails would be located on existing closed road prisms and would avoid habitat features important to wildlife such as: major ridgelines, saddles, wetlands.	New recreation trails

2.4 Monitoring

The activities described below would be taken during and following the proposed actions to determine if treatments follow the proposed actions, incorporate design criteria, meet the purpose and need, and are effective.

- *Road Closures:* Road closures would be monitored annually for up to five years to determine the effectiveness of the closures. If monitoring reveals the closure is ineffective, additional steps (e.g., different road block, placement of additional logs and boulders) would be taken to increase the effectiveness.
- *Invasive Plants*: Treat and monitor road systems, landings, fuel breaks, gaps and other disturbed areas for five years following road construction.[12]
- *Vegetation Management*: All vegetation management projects would be monitored both during and after treatment to determine if management direction and guidelines are being met. Monitoring would check that marking is meeting the prescription and marking guide. Monitoring would also be conducted during harvest operations to ensure prescriptions are being met. Post-harvest reviews would be conducted within one to three years after harvest to determine if the harvest met the prescription and if any changes to the fuels, site preparation, or reforestation are needed.
- *Regeneration*: Natural and artificial regeneration occurring following treatment would be evaluated for species composition and numbers of trees per acre. Survival surveys in plantations would be conducted the first- and third-year following harvest to ensure the unit is fully stocked with seedlings.
- *Post-harvest Reviews*: A post-harvest silvicultural and fuels field review would be done on a random sample of activity units within the analysis area no later than 1-year post-project completion. Information from field visits would help inform internal after-action reviews, identify the degree to which silvicultural objectives were met, and identify if any changes would be needed to post-harvest activities.
- *Fuels*: Fuels monitoring would occur in selected units and include pre-burn and post-burn photo/visual monitoring. In addition, photo-plots, duff and fuel depth measurements, and vegetation sampling plot monitoring may also be conducted.
- *Fuels*: During prescribed burning, smoke conditions would be monitored using a variety of methods (e.g., smoke camera, air quality sensors) and following the Interagency Prescribed Fire Planning and Implementation Procedures Guide. (NWCG, PMS 484 2017)
- *Insect and Disease*: Annual Aerial Forest Insect and Disease surveys would identify the locations and severity of insect and disease populations. Particular attention would be made to monitor tree mortality and subsequent insect activity in units where prescribed fire is applied. The surveys would be reviewed by the silviculturist and would provide information on insect and disease trends, success of treatments, and provide information to inform future decisions.
- *Water Quality*: Stream temperature and bacteria monitoring would be performed annually per the Memorandum of Agreement with the Washington Department of Ecology to identify changes in water quality impaired streams and provide data that no

[12] Forest Plan Forestwide standard FW-STD-IS-01 Invasive Plant Prevention

new impairments are occurring in relation to management activities occurring within the subwatershed unit.

- *Best Management Practices*: Ten percent of harvest and fuels treatment units would be assessed for best management practices implementation effectiveness. Ten percent of RMA acres treated would be reviewed for aquatic stand prescription implementation and effectiveness over ten-year period post-harvest. Pretreatment and post treatment shade monitoring would occur on ten percent of harvest units where acres treated occur within the RMA.
- *Road Stabilization*: Maintenance level 1 roads identified to not be hydrologically stabilized in the proposed action (i.e. closed with a gate, culverts remain in place) would be monitored for proper drainage at a minimum every 5 years. Additional monitoring would be triggered by events such as higher than expected use or climatic events (e.g., rain-on-snow, above average high intensity short-duration precipitation events). High run off events would trigger a monitoring trip as soon as access would allow, and staff could be made available to do so. Ten percent of roads identified for hydrologic stabilization would be monitored for Best Management Practice (BMP) implementation and effectiveness. Ten percent of roads identified for decommissioning would be monitored for BMP implementation and effectiveness. Ten percent of temporary roads would be monitored for BMP implementation and effectiveness during active use and post-use obliteration activities.

3.0 Environmental Impacts of the Proposed Action

This section summarizes the biological, physical and social environments of the affected project area and the potential changes to those environments due to implementation of the proposed action. The potential direct and indirect effects of the proposed action are evaluated by resource area and 'cumulative effects' are then assessed within the context of relevant past, present and reasonably foreseeable future actions in the project area. A list of the other actions is located in the project record. In preparing the analyses, the IDT reviewed and considered the most relevant and current scientific data available, then worked collaboratively to reduce resource conflicts. Consistency of the proposed action with laws and requirements imposed for environmental protection is documented in individual specialist reports and in the project record.

The proposed action is described in Chapter 2. Individual resource reports are incorporated by reference and available in the project record at the Newport Ranger District office, or electronically at https://www.fs.usda.gov/project/?project=54315.

3.1 Fire, Fuels and Forest Vegetation

The following is a summary of the Sxʷuytn Silviculture and Fuels Resource Report (Larkoski, Napier and Montgomery 2020).

Methodology

The structure stage[13] by vegetation type is assessed across the landscape primarily through data derived from LiDAR[14]. Aerial photos and silvicultural reconnaissance are actively utilized to confirm LiDAR observations. Structure data was also be obtained through district records of past activities or stand exams. Due to the importance of larger trees to wildlife and forest processes, a sampling of potentially late structure trees was identified using LiDAR and reconnaissance. These would be checked and refined during silvicultural reconnaissance and sale preparation activities (unit layout, marking).

Tree and stand growth were monitored by increment bores of the conifer species present. The last 10-year periodic increment is a reliable indicator of tree growth and overall stand vigor.

The Forest Vegetation System (FVS) is used to simulate prescribed fire in harvest units. Through modeling, prescribed fire effects on 1000-hour fuel loadings, canopy base height, and crown bulk density were analyzed. The use of FVS modeling aids us in determining proper treatments throughout the project. The values are meaningful in determining the potential effects of prescribed burning post-harvest and are indicators of future wildfire behavior and potential for fire control effectiveness. FVS runs were not executed on specific units, however FVS runs from previous assessments in similar settings were referenced to determine treatment effectiveness in this project area.

Peer-reviewed scientific articles, literature, books, white papers, and in some cases, references to unpublished data were used to support proposed activities. Geographic Information Systems (GIS) software was used to produce maps and calculate data and statistics needed for this report. Professional knowledge is an important source of information and is derived through sampling, observation, experience and historical study. Another source of information comes from collaborative processes and stakeholder comments during scoping and project field trips.

Landscape Evaluation

Specialists from the Washington Department of Natural Resources (DNR) created a landscape evaluation to inform planning during the initial project stages (Churchill and Jeronimo 2018). Similar to all environmental assessment analyses, the landscape evaluation uses peer-reviewed research, the DNR 20-year Strategic Plan, an Historical Range of Variability[15] (HRV) assessment, climate and vegetation interaction data, fire risk data, habitat and connectivity concerns, economics, feasibility of project activities, and diverse landowner objectives to describe the current and potential future outcomes across the landscape. Historical photos also help describe how the historical landscape appeared in the past versus the current condition. To predict the future vegetation growth and patterns, the landscape evaluation used the same data and methods as those used in the CNF Land Management Plan (LMP)[16].

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[13] Structure stage = A delineation of a forest stand based on age class, density and canopy closure. See Table 7, page 26.

[14] LiDAR = Light Detection and Ranging; it is a remote sensing method used to examine the surface of the Earth.

[15] Historical range of variability is the range of vegetative patterns and density conditions found in a specific forested landscape over time.

[16] CNF LMP pages 33 to 35.

The landscape evaluation complements the Forest Service analysis methods for project specific assessments and provides maps on potential moisture stress, pattern departure metrics, and modeled wildfire intensity.

Spatial and Temporal Context for Effects Analysis

*Spatial (Location and Scale)***:** Forest conditions are analyzed at both the stand and landscape-level. HRV conditions of forest structure were analyzed at the watershed level. The planning area boundary does not follow the watershed boundaries, but forest conditions must consider all vegetation within the watersheds that intersect the planning area.

Temporal (Time): This analysis measures effectiveness of vegetation treatments both in the short and long term. Effects of treatments occurring within the first 5 to 10 years would be considered as short term. Long term effects would be those occurring 11 to 50 years following treatments.

Incomplete and/or Unavailable Information

Condition Based Management

Condition-based management stems from the recognition that the environment is dynamic, changing as ecosystems respond to changing natural and human caused events. The flexible toolbox approach is a condition-based management strategy that allows predetermined treatments to be aligned, prior to implementation, with current conditions on the ground. For example, with vegetation treatments, a combination of selection criteria and vegetation conditions are used to determine habitat and forest cover filters and modifiers, as well as the appropriate treatments for each. Using existing stand data from silvicultural reconnaissance, these conditions and criteria are quantified to estimate the acreages of specific treatments to propose in a project area. These estimates are used to analyze the effects from those treatments.

While this approach accommodates making changes based on updated information from field reviews, it differs from what is conventionally referred to as adaptive management. With the flexible toolbox approach, a suite of potential treatment types and intensities are proposed and analyzed as a response to specific resource conditions. Additional field review is conducted before implementation. Using this ground-based information, the most appropriate treatments to move resources toward the desired conditions are selected from the analyzed suite. Using this approach, a series of current conditions is described and then treatments identified that could be applied to move the landscape toward desired conditions (generally HRV targets). Decision points, based on conditions at the time of implementation, would be used to help lead to the desired condition.

Planned silvicultural and fuels reduction methods (e.g. commercial thinning, regeneration harvests and prescribed fire) may change as a result of silvicultural and other specialist reconnaissance and during the development of stand-level silvicultural prescriptions. The field work conducted during prescription development is more intense where a majority of each treatment unit is visited. During planning, a sample of units is visited to check information gathered from stand exams, LiDAR, and aerial photogrammetry.

Existing Condition

Vegetation Types

Forested plant association groups (PAGs) were assigned to Landfire Biophysical Settings and given a subsequent common name vegetation type. Landfire biophysical settings represent vegetation that may have been dominant on the land before European settlement and are based on an approximation of the historical disturbance regime (LANDFIRE 2014). There are essentially five vegetation types within the Sxʷuytn analysis area (Table 6). Approximately 1,440 acres of NFS land within the analysis area is currently identified as "non-forested" which means it does not grow trees well.

Table 6. Vegetation types within the project area, NFS lands only

Vegetation Type	Acres	Percent
Douglas-fir Dry	16,650	41
Northern Rocky Mountain Mixed Conifer	15,570	39
Western redcedar / Western hemlock	4,740	12
Subalpine fir / Lodgepole pine	1,760	4
Spruce / Subalpine fir	140	<1
Non-Forest	1,440	4
Total	*40,300*	*100*

Resource Indicators

Forest Structure

Tree structure is classified into five general groups based on diameter and canopy cover as shown in Table 7. The diameter at breast height (dbh) in inches is based on the quadratic mean diameter of trees whose heights are in the top 25% of all tree heights in the stand. This generally means the diameters of the larger co-dominant trees (trees in the upper canopy) in a stand are used to define the structure class (CNF LMP 2019).

Table 7. Structure class definitions based on canopy cover and diameter

Structure	Definition
Early	Trees less than 10" dbh or canopy cover < 10%
Mid Open	Trees 10-20" dbh, canopy cover ≥ 10% and < 40%
Mid Closed	Trees 10-20" dbh, canopy cover ≥ 40%
Late Open	Trees ≥ 20" dbh, canopy cover ≥ 10% and < 40%
Late Closed	Trees ≥ 20" dbh, canopy cover ≥ 40%

Patch size and composition of forest structure

Currently, the forested landscape in this project area is fairly homogenous with uniform canopy cover. There are some natural openings where meadows occur, where the terrain is rocky or of low site productivity, and insect or disease affected areas.

Historical forests had a higher composition of widely distributed large, old trees over a much broader area due to low, mixed, and high severity disturbances such as wildfires. Many of these trees were resistant to fire and survived extended droughts (e.g., ponderosa pine, western larch, and to an extent, Douglas-fir and white pine). Old trees of fire intolerant species became more common as fire frequency decreased and in wet microsites (Hessburg et al. 2015). The area south of Browns Lake is an example of this, with stands comprised of older western hemlock.

Desired forest structure condition of patch sizes by vegetation type is described in the CNF LMP[17]. Historical photos of this area from 1935 show more open forests with large patches of early structure stages. By 1935, patch size and arrangement were likely affected by wildfires, grazing, homesteading, and some timber harvest. As a result of fire suppression and forest management, a once resistant forest composition and pattern has shifted away from the HRV and moved toward late seral, shade-tolerant species uniformly distributed across the landscape (Hessburg et al., 2005; Keane et al., 2002).

Stand Density (BA, TPA, SDI)

Stand density is described by basal area (BA), trees per acre (TPA), and stand density index (SDI). SDI calculation requires plotting the logarithm of the TPA against the logarithm of the BA and is used to define the limit of maximum stocking (SDImax). When a stand reaches 55% of SDImax, it signals the start of stand self-thinning and imminent mortality. Density is a good measure of current and future growth and mortality in stands. Stand density data in Table 8 are based on a sample of the Sx^{w}uytn project area (NFS lands only).

Table 8. Estimated stand density condition in Sx^{w}uytn analysis area.

Resource Indicator	Measure	Range
Basal Area (BA)	Square feet per acre (ft^2/ac)	0–>300 ft^2
Trees per acre (TPA)	Number of trees per acre	0–>2,000
Stand Density Index (SDI)	Percent of SDImax	0%–>55%

Mortality, Disturbance Agents

Disturbance[18] is both a natural and necessary part of forest ecosystems; it is what drives the stages of forest succession and allows trees to grow, dry and recycle (Campbell and Leigel 1996). Mountain pine beetle, fir beetle, root rot *(Armillaria, Annosus* and *Coniferiporia*), Indian

[17] Forestwide Desired Condition FW-DC-VEG-03 Forest Structure

[18] In forest ecology, a disturbance is any relatively discreet event in time that disrupts ecosystem, community, or population structure and changes resource availability, substrate, or the physical environment (White and Pickett, 1985).

paint fungus *(Echinodonctium tinctorum)*, white pine blister rust *(Cronartium ribicola)*, mistletoe *(Arceuthobium sp.)* have all been detected in the project area. A recent analysis showed 87% of the random plots (sites visited) in the project area were displayed root rot. (Ferguson and Omdahl, 2019 (revised 2020)). This factor significantly shaped proposed actions to restore forest stands to better health.

Data from the Forest Service "Cooperative Forest Insect and Disease Aerial Detection Survey, 2019" indicates that 16,600 acres, from 2015 through 2019, within the Sxʷuytn project boundary were impacted by insect infestations: 58% was fir engraver *(Scolytus ventralis)*, 19% western spruce budworm *(Choristoneura occidentalis)* and 12% Douglas fir beetle *(Dendroctonus pseudotsugae)*. Acres infested with fir engraver and Douglas fir beetle have increased sharply since 2017.

Fire and Fuels

Disturbance and Fire History

Natural disturbances may include events such as fire, insects and diseases, wind, snow, and ice storm events. At the landscape scale, natural disturbances occurred at both regular and irregular intervals with varying degrees of intensity. Historically, fire has been the primary disturbance factor driving both species composition and structure. (Smith and Fisher, 1997) High severity, low frequency fire regimes favor the shade-tolerant and fire-intolerant tree species such as western red cedar and western hemlock. These species are generally found growing within the more protected draws and cooler, north-facing aspects. Conversely, low severity, high frequency fire regimes favor the shade intolerant and fire-tolerant species such as western larch and ponderosa pine. These species are generally found on the more open ridges and dryer, south-facing aspects. (Agee 1993) There is limited mapping available regarding wildfire history in the project area prior to the 1980s. Qualitative comparisons with aerial photographs from the 1930s to 2009 indicate a general trend of the establishment of forest cover in areas that were not previously forested prior to the arrival of European settlements. This phenomenon is largely due to the removal of fire as a recurring disturbance mechanism on the landscape (i.e., fire exclusion). Fire exclusion has allowed fuels to accumulate on the forest floor – the duff is thicker and the amount of down wood is probably greater (Smith and Fisher, 1997; DeLuca and Sala, 2006).

The second major observed effect of fire exclusion is the shift in species composition away from dominance of fire-resistant species (ponderosa pine and western larch) to a substantial increase and co-dominance of fire-intolerant species, primarily western red cedar and grand fir. The warm-dry stands now have a relatively dense mid and understory component of grand fir, Douglas-fir and western red cedar.

Fire Regime

Fire regime is the characteristic fire trait occurring in an ecosystem. In other words, it is the general role wildland fire would play across a landscape in the absence of modern human intervention (Agee 1993). Fire regimes have been defined in terms of fire frequency, severity, stand effects, landscape spatial patterns, and season of occurrence. However, fire frequency and

severity are the most common traits studied by ecologists and used by land managers. (Haan and Bunnell 2001)

Fire behavior and vegetation response is classified into three broad categories based on the severity of the fire's characteristic to that regime. These categories are low, mixed (or moderate), and high severity fire regimes. Site productivity and fire frequency, or the amount of time between fire events, also plays an important role in the fire regime. In essence, higher site productivities and longer fire frequencies generally allow for more closed canopy conditions. In contrast, marginal growth sites with short fire frequencies contribute to open forest canopy conditions. Table 9 shows acres of NFS land within the project area by fire regime. More detailed definitions of the fire regime classes are in the Silviculture and Fuels Resource Report in the project record.

Table 9. Existing Fire Regime – NFS Acres

Fire Regime (FR)	Approximate Acres (percent)
FR I – High Frequency, Low Severity (fire return interval <35 years)	19,400 (21%)
FR III – Mixed or Moderate Severity (fire return interval ~35 to 75 years)	66,170 (72%)
FR IV - Mixed to High Severity (fire return interval ~100+ years)	3,280 (4%)

Fire Regime Condition Class (FRCC)

A fire regime condition class (FRCC) is used to describe the degree of departure from the historic fire regimes that results from alterations of key ecosystem components. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime and includes three condition classes for each fire regime. This departure results in changes to one or more of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, and drought). (FRCC Guidebook 2010; Agee 1993; Hann and Bunnell 2001)

Table 10 describes the attributes of each FRCC. The FRCC was determined using stand exam data, CNF Plant Association Groups (PAG) imagery and local historical fire records and is most useful at the landscape level. It is important to note the FRCC is highly variable across the analysis area; vegetation structure and composition, minor changes in slope, aspect, or topographic position can have dramatic effects on the vegetation pattern of the landscape. PAG imagery, a tool designed for landscape scale assessment, does not always identify these local variabilities at the project scale.

A FRCC map with information on FRCC values in the Sx^{w}uytn area is located in the project record.

Table 10. Fire Regime Condition Class Attributes (NIFC[19] 2003)

Condition Class	Attributes
Condition Class 1	Fire regimes are within or near their historical range. The risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies (either increased or decreased) by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within their historical range. **~24,000 acres of FRCC 1 exists in the analysis area. (~28 %)**
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed from historical frequencies by more than one return interval resulting in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape pattern. Vegetation attributes have been moderately altered from their historical ranges. **~38,700 acres of FRCC 2 exists in the analysis area. (~46%)**
Condition Class 3	Fire regimes have been substantially altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed by multiple return intervals resulting in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape pattern. **~21,300 acres of FRCC 3 exists in the analysis area. (~26%)**

Wildland Urban Interface (WUI)

The Wildland Urban Interface or WUI can be described as the area that undeveloped vegetated land and structures or infrastructure have a direct effect on one another. Areas that affect the WUI are not limited to the land directly adjacent to the structures or the defensible zones but extend into the larger surrounding landscapes that may pose a risk to these structures and their defensible zones.

The Kalispel Indian Reservation, and the communities of Usk, Bead Lake, and Marshal Lake, are located within or directly adjacent to this project area. The entire project area is considered a low density WUI by the Pend Oreille County Community Wildfire Protection Plan (CWPP). There are areas identified as high-density structure areas within this designation, mainly near Leclerc Road and Bead and Marshal Lakes. A map showing WUI designations is in the project record for reference.

[19] NIFC = National Interagency Fire Center; www.nifc.gov

In addition to areas designated as high-density structure areas, there are multiple private inholdings within the project area. These are small inholdings with few or no permanent outbuildings. There are also multiple transmission and power lines throughout the project area.

Structure Risk and Effect on State, County, and Private Ownerships within the Sxʷuytn Wildland Urban Interface (WUI)

Home and structure risk from potential wildfire is largely dependent on the following: flammability of building materials, adjacent wildland fuels and firebrands.

Flammability of building materials: The ignitability of building materials is the single most important consideration for determining structural risk during a wildfire event (Cohen 1999). The Washington DNR and local county fire districts administer programs specifically designed to address this issue.

Firebrands: Firebrands are burning pieces of wood that can be lofted into the air and ignite structures or adjacent vegetation well beyond the fire's boundary. Firebrands are an important ignition factor within the WUI. Flammable structures and vegetation can ignite and burn from firebrands lofted a half mile or more downwind from a wildland fire (Cohen 1999).

Adjacent wildland fuels: Wildland fuels on adjacent private ownerships include relatively open stands of immature ponderosa pine and Douglas-fir, closed stands of mature lodgepole pine, grand-fir, western larch, Douglas-fir and western red cedar, and open stands of immature Douglas-fir and lodgepole pine with light to moderate logging slash. Convective and radiant heat energy from a high intensity surface or crown fire can directly ignite wildland fuels at distances up to 120 feet (Cohen and Butler 1999).

Air Quality

The Sxʷuytn project area is within an Environmental Protection Agency (EPA) designated Class I airshed. Prescribed burning smoke originating within or potentially impacting this airshed is regulated by the Washington Department of Natural Resources – Smoke Management Division (WA DNR) and EPA. Due to the transitory nature of smoke derived from prescribed burning, it is likely to have little effect on this Class I airshed. The existing sources of particulate emissions within or near the Sxʷuytn analysis area include smoke from neighboring prescribed fire projects and including, but not limited to, industrial mill sites, forest residue burning on NFS and non-NFS lands; smoke from residential wood stoves and agricultural activities in the Pend Oreille valley (e.g., Newport, Cusick, Usk); and vehicular dust and exhaust.

The closest current air monitoring site is located in Sandpoint, Idaho, approximately 25 miles east of the project area.

Air quality at this site is measured as AQI (Air Quality Index). The AQI is a tool used to inform the public of local levels of air pollution and the associated health concerns. Although local wildfires and some prescribed burning did contribute to some reduced air quality days around the monitoring site in 2018 and 2019, the majority of the poor air quality days are a result of wildfire smoke from surrounding areas.

Proposed activities that would reduce potential smoke emissions over a given area include:

- Prescribed burning in the spring and, to a lesser extent, in the fall when large woody debris and soil and duff moistures are relatively high. Burning when large fuels and organic layers are wet often result in lower large and organic fuel consumption, less smoldering, and a major reduction in smoke emissions (Ottmar et al. 2001);
- Prescribed burning when conditions favor the optimum combustion of the 1, 10 and 100-hour targeted fuels (e.g., slash and woody debris under 3" diameter); and
- Selective removal of the 1,000 and 10,000-hour fuels such as pulp, roundwood and sawlogs. (NWCG, PMS 484 2017)

3.1.1 Direct and Indirect Effects

Vegetation

This section describes the effects that each proposed activity would have on the existing vegetation condition, spatially and temporally. Actions were considered in the context of restoring forest health in the long term through incremental short-term treatments and based on the scientific principles balancing past patterns with anticipated future vegetative conditions.

Commercial treatments in the proposed action would include up to 61% of the CCA Creek watershed acres, 75% of the Middle Creek watershed acres, 81% of the Skookum Creek watershed acres, 88% of the Exposure Creek watershed acres and up to 61% of the Cusick Creek watershed acres over 20 years (calculated on NFS-administered lands). Stands with unique late structure that meet the needs of various wildlife species (e.g., goshawk), portions of Riparian Management Areas (RMA) and some areas without road access are not proposed for mechanical treatment. We anticipate, based on past projects, up to a 30% reduction of proposed treatment acres due to site-specific resource considerations and changed conditions revealed in further on-site inspections.

Table 11. Estimated existing, post and future conditions by metric for the proposed action.

Resource Element	Resource Indicator	Measure	Existing Condition Ranges	Post[20] Proposed Action	Proposed[21] Action (2060 Conditions) Range
Forest Structure	Structure Stages	Diameter, canopy cover, acres	See narrative on Direct and Indirect Effects		
Stand Density	Basal Area (BA)	Square feet per acre (ft^2/ac)	80 – >300 ft^2	50-130 ft^2	90 – 160 ft^2
Stand Density	Trees per acre (TPA)	Number of trees	180 – >2,000	19-300 (>5 dbh) 300 (<5dbh)	70 – 300

[20] Data derived from three USFS CNF and one Kalispel Reservation past project areas. The USFS and Kalispel data are from a variety of vegetation types, structure and tree ages represented within the Sx^{w}uytn project area.

[21] Long-term condition at the project scale (calculated for vegetation condition in calendar year 2060).

Resource Element	Resource Indicator	Measure	Existing Condition Ranges	Post[20] Proposed Action	Proposed[21] Action (2060 Conditions) Range
Stand Density	Stand Density Index (SDI)	Percent of SDImax	20% – >55%	7% – >36%	27% – >35%

There may be areas mapped as unsuitable within proposed treatment units. These areas may include, but are not limited to, rock outcroppings, low productivity areas with shallow soils, and known unstable slopes. Some of these areas may still be treated to meet the goals for prescribed burning or meet objectives for treating fuels in the WUI, if feasible[22]. Openings created by implementing a 'shelterwood with reserves' prescription would be 40 acres or less. Approval and public notification would be required if any treatment unit is found during silviculture reconnaissance that would be larger than that threshold[23].

Forest Structure

In general, thinning and regeneration harvests would allow the retained trees to grow more vigorously, restore conditions beneficial for prescribed burning, and increase resilience and resistance to disturbance. The effects to forest structure associated with each proposed treatment are described in this section. All effects to forest structure follow the Forest Plan standards and guidelines for trending towards desired conditions.

Unique late structure would be identified for retention in all treatment types. This would trend stands toward late stand structures, which are currently deficient in most vegetation types. However, portions of this structure class, particularly those already suffering extensive root rot, may be removed for safety, operations, to meet desired conditions for structural stages, limit the spread of insect infestation or disease, where needed for fuel reduction, or to promote special plant habitats.

Commercial thinning, regeneration treatments and commercial thins with group selections would primarily take place in mid-closed stand structures (~17,970 acres or 74% of the proposed 24,400 treatment acres), with patches of other structure (including all unique late structure[24]) stages retained to the extent possible within the units. Most commercial thinning and commercial thinning with group selection stands would require another entry in about 15 to 25 years. A commercial entry would occur approximately 30 to 40 years following implementation of proposed regeneration units, aside from a precommercial thinning 15 years post-harvest. These treatments would trend forest conditions towards restoring the historical range of variability.

Commercial Thinning

Treatments would result in some mid-closed stands moving toward mid-open structure stages in the short-term, with others remaining mid-closed. Diameter and canopy cover describe this

[22] Forest Plan Forestwide Standard FW-STD-VEG-03 Timber Production, Forest Plan Forestwide Desired Condition FW-DC-VEG-11 Fuels Treatments in Wildland-urban Interface

[23] Forest Plan Forestwide Standard FW-STD-VEG-04 Even-Aged Harvest Openings

[24] Forest Plan Forestwide Desired Condition FW-DC-VEG-05 Biological Legacies

change. It is estimated that 50% of stands would retain a canopy cover of 40% or more immediately following commercial thinning treatments, though some may be lower. The other half of commercial thinning units would reduce canopy cover enough to move stands into the mid-open structure stage. Some late-closed Douglas-fir stands may go to late-open conditions.

Canopy cover may be fairly uniform within some commercial thinning units. However, there would be many areas where canopy cover and stand density would not be uniform within treatment areas. Thinning in dense stands with open areas around wet or rocky features, or with other existing openings and areas where large diameter trees are present may result in 'variable density thinning'. These components would leave a variable stand density (meaning a wider range of residual basal area or trees per acre). Leaving groups of trees within treatment areas or flagging out retention areas, such as hardwood stands, also creates variable stand conditions. These stands would move from mid-open to mid-closed over time as trees grow larger due to increased growing space, light, moisture, and nutrients. Based on past FVS models, diameter growth is usually higher in thinned stands than unthinned stands. As trees are released from competition, crowns expand and diameter growth increases. Diameter growth is strongly and inversely related to stand density (Tappeiner et al. 2007). Eventually, many of these stands would grow into late-closed.

Species composition within a stand would be modified by removing trees through thinning. Shade tolerant trees that have a low tolerance for fire would be removed in higher quantities in Douglas-fir dry and Rocky Mountain Mixed Conifer vegetation types. Shade intolerant species which are more fire tolerant can be favored. There would also be exceptions to this approach such as developing thermal cover for big game, providing shade adjacent to riparian areas within dry to moist site vegetation types, or leaving trees with characteristics desirable for wildlife. Shade tolerant species would be left in appropriate historical vegetation types, on moist or wet aspects, or in wet microsites.

Shelterwood Regeneration Treatments

The direct effects caused by commercial thinning on tree growth, retention of unique late structure, and species composition are also applicable to regeneration treatments. The main difference in effects is that residual overstory tree density would be lower, density of regeneration (seedlings) may be higher, and it would take longer for these stands to reach late structure stages. Most of these stands would move from mid-closed to mid-open following harvest. A main component of regeneration harvests is to change species composition to more closely resemble the historical variation within the major vegetation types.

Shelterwood regeneration treatments would result in mid-closed stands becoming mid-open structure stages in the short-term. Under the proposed action, canopy cover may be reduced lower than 40% immediately following harvest in an estimated 60% of shelterwood treatment units (approximately 4,000 acres). Previous project area FVS projections[25] estimate that canopy cover would increase to greater than 40% in 50 years. There would be areas of dense canopy cover or canopy gaps around unique late structure, wet sites, streams, and on rocky sites.

[25] Recent projects include Boulder Park (2016), Timber Mountain (2017) and Limestone (2008).

These stands would move from mid-open to mid-closed over time as trees grow larger due to increased growing space, light, moisture, and nutrients. Eventually, these stands would grow into late-closed. Species composition of these regenerated stands would increase the abundance of ponderosa pine, white pine, western larch, and Douglas-fir. This species composition shift would help move stands in Douglas-fir dry and Rocky Mountain mixed conifer vegetation types towards their historical range of variability.

Natural and artificial regeneration (planting) would move species composition from current dominance by shade-tolerant species to the early seral, fire-resistant species such as ponderosa pine, white pine, western larch, and Douglas-fir, mainly on the Douglas-fir dry and Rocky Mountain mixed conifer sites. However, these species were also present in other vegetation types, but may have not been the dominant vegetation. Removal of many shade-tolerant species from Douglas-fir dry and Rocky Mountain mixed conifer vegetation types would increase shade intolerant, fire-resistant species suited to the fire regime and frequency of those sites. Not all shade tolerant species would be removed from the drier sites due to logging feasibility, size of trees, or microsites. Species such as red cedar, hemlock, and Engelmann spruce would be managed by retaining or re-establishing (by natural seeding or planting) in other vegetation types where they historically established and grew. Managing for shade-tolerant species in wetter or colder vegetation types would be appropriate for the fire regimes of those types. Maintaining the appropriate species composition within all of the vegetation types would provide for a diverse composition and arrangement of species across the landscape.

The areas dominated by small diameter dense stands or mature lodgepole would be regenerated (most trees harvested) as the quickest way to move the stand towards late structure. Tree species suitable to each site would be retained. These tree species may provide seed sources, some shade for regeneration, and in some cases provide the large tree structure[26] that is already mostly deficient across the landscape.

In past Forest projects, tree planting has been implemented both in a uniform arrangement and in smaller, more isolated groups. In large openings, trees may be planted in a fairly uniform arrangement. However, natural seeding may occur from residual overstory trees and would add to and change the spatial arrangement of regeneration. Trees planted in smaller, spatially explicit groups may occur when groups of trees are retained in the overstory, thus creating conditions for more patchy planting. Small openings may be left to naturally seed in, provided the residual overstory retains desirable seed sources for the site.

Commercial Thin with Group Selection

The direct effects caused by commercial thinning on tree growth, retention of unique late structure, and species composition are also applicable to commercial thin with group selection treatments. The main difference in effects is that insect, disease and stagnation pockets would be addressed via small openings averaging 3 acres in size. The commercial thin with group

[26] A shelterwood focuses on retaining early seral species (e.g., western larch, Engelmann spruce, western white pine). Those residual species should be of sufficient size to provide the seed source and give some protection to the ensuing regeneration. Removal of competing trees results in more growing space and high potential to increase diameter and height, above their current metrics, rather quickly. Historical forests had a higher composition of widely distributed large, old trees over a much broader area due to low, mixed, and high severity disturbances.

selection areas would be left for natural regeneration to take place (if sufficient and appropriate seed tree species are present). These areas would be artificially regenerated if the establishment of shade tolerant species is likely or if there are no desirable seed trees adjacent to the opening. Over time the commercial thin with group selection areas would move towards mid open and closed stages in a mosaic pattern.

Trees that are hazardous to the safety of people and operations (e.g., severely leaning trees, trees with internal decay as a result of root rot or fungus, dead trees or dead top trees resulting from bark beetles or other damaging agents, and forked tops or physical defects) may be removed within treatment units. If these trees contain no merchantable timber and do not present a safety hazard, they may be left in the forest for other resource benefits.

Effects Common to Commercial Thinning, Regeneration and Commercial Thin with Group Selection

Commercial thinning, regeneration and commercial thin with group selection treatments would reduce tree competition. Within the next ten years following treatments, the residual trees are expected to improve in vigor, growth and resilience to disturbance. Most seral, large diameter trees would be retained where suited to the site and generally healthy. Gaps created by thinning would encourage tree growth (species composition varies depending on size of gap), shrubs, grasses and forbs. Larger gaps would create conditions favorable to shade intolerant species while smaller gaps with more shade would be more favorable to shade tolerant species. Large openings that are created through regeneration treatments would encourage new trees that would be artificially regenerated or naturally seeded. These areas would also be filled by shrubs, forbs, and grasses.

Treatments at the stand level in this project may result in some homogenous patterns such as uniform overstory, stand age, diameter distribution and gaps at the small scale. The coarse scale (landscape scale) would be composed of a variety of forest types, species, and age classes. Treatments would help the landscape become more resilient to changes from disturbance over time. The result of treatments and no-harvest areas would direct some forest conditions towards complex structures (e.g., a mosaic of open and dense canopies).

At the stand level, trees which would not live until the next entry (approximately 15-25 years), trees with live crown ratios less than 35%, trees with height to diameter ratios greater than 80 (Hagan and O'Hara 2001), trees showing signs of insect or disease, and trees with mechanical defects, are preferred for removal over trees with vigorous healthy crowns with relatively few defects. However, no treatment would remove 100 percent of these trees. Approximately 15,880 acres (39%) within the project area are deferred from commercial treatment meaning these trees would remain across the landscape. These include the areas that would be set aside for unique late structure, northern goshawk areas and various areas lacking reasonable access for harvest operations. These areas may be at risk to insect and disease outbreaks in the future.

In general, management activities would retain and emphasize the largest diameter trees across the landscape based on structure, species, and vegetation type. In the long-term, these trees would continue to grow larger. On sites with low and moderate fire severity regimes, large diameter early seral species would be better adapted to survive future disturbance from fire.

Research indicates that root rot may increase due to management[27]. The percentage of merchantable volume (selective cutting) threatened or killed by *Armillaria ostoyae* is usually higher in cutover than undisturbed plots (Morrison et. al 2001). However, retention of tolerant species and planting or natural seeding of species resistant to root rot would ensure future tree and canopy growth.

The economic return from commercial harvest treatments could be used to do future precommercial thinning, prescribed burning, mastication, or other maintenance treatments.

Treatments along the wildland urban interface would aid in reducing the risk of insect, disease and fires spreading between Forest Service, private and other ownerships lands.

Treatments within and around aspen and black cottonwood stands would release these trees that are currently suppressed by conifers. The increase in light and growing space from the removal of conifers would result in increased growth rates for aspen and cottonwood. Cutting individual aspen or cottonwood trees or using prescribed fire in these stands would increase spontaneous sprouting.

Some trees within thinned stands or adjacent unthinned stands may be susceptible to wind damage if the treatment area density is lowered significantly; severe weather events that may occur immediately after treatment due to topographic exposure are not anticipated, but could happen. However, research indicates that the effect of wind damage to thinned stands (even with gap formation) is minimal (Tappeiner 2007, Roberts et al. 2007, Gordon 1973).

Riparian Management Area (RMA) Thinning (and identified perennial streams)

An aquatics specialist would assist in the layout, prescriptions, and implementation of treatments within the RMA and near identified perennial streams to move areas toward desired conditions. Additional information is in the Aquatics portion of this Chapter (Section 3.2).

A three-zone strategy was developed for the Forest and modified for this project. Any treatments within RMAs will follow the three-zone strategy (Appendix B) in consultation with district or forest aquatics staff.

Treatments within RMAs and adjacent to identified perennial streams would increase diameters of residual trees to provide shade and future coarse woody material and reduce the insect and disease prone shade tolerant component.

Artificial or natural regeneration (RMAs)

Riparian thinning would create conditions favorable for coarse woody material recruitment and growth of large diameter trees in the short and long term.

This alternative would also allow for the reintroduction of riparian vegetation, such as Engelmann spruce, western red cedar, western hemlock, and hardwoods within the RMAs, as well as Douglas-fir, western white pine, western larch, and ponderosa pine, along identified

[27] *Armillaria* can survive in a tree stump for up to 40 years. If susceptible tree species restock an infected site, the root rot fungus can continue to spread.

perennials and flood plains where these species historically existed. Thinning would increase growing space, increase nutrient and light availability for remaining trees and new seedlings.

Precommercial Thin

This treatment removes noncommercial trees (usually less than 7-inch diameter), retaining the preferred species, to provide growing space to the residual stand and reduce the intensity and crowning behavior of wildfire.

Precommercial thinning would change the structure stage of stands from mid-closed to mid-open immediately following treatment. These stands would trend towards mid-closed over the next 30 years or more.

Similar to commercial treatments, these stands would result in improved species composition, tree vigor, growth and resilience to disturbance. Treatments would open growing space that would be filled by the residual trees, new conifer regeneration, shrubs, grasses and forbs. Invasive weeds may be introduced or spread during project activities.

Late-open and Late-closed Structure Stands

Some late-open and late-closed stands would be harvested under the proposed action. As an example, late-closed, Douglas-Fir dry stands (high BAs) would be moved to late-open conditions, a structural stage that is underrepresented compared to the HRV. A preliminary sampling of late-open and late-closed stand structures and stands with unique late structure have been identified during field visits. Areas of unique late structure would be retained.

Some late-closed stands may be prone to high severity damage from wildfire, which would cause a change to the structure stage in the immediate patch. However, these areas are somewhat small and scattered throughout the project area, so they may be surrounded by treatment areas that decrease the rate of fire spread or severity.

Stand Density – Basal Area, TPA, SDI

The proposed action would result in lower stand densities across the project area from the action of removing trees by commercial harvest and thinning. This would allow for the increased growth of trees, moving stands toward their historical range of variability, and reducing the incidence of mortality through inter-tree competition. The data presented in Table 11 shows the estimated existing condition and the future range of conditions for each metric based 40 years after the proposed action. There may be areas with no trees or basal area (e.g., an opening with 0 TPA and 0 square feet of basal area) or areas of trees with 160 square feet of basal area after the area has been treated.

Basal area, trees per acre, and stand density index are directly decreased through removing trees during commercial harvest, precommercial thinning, and prescribed burning. Noncommercial treatments such as grapple piling, pile burning, and whip felling would also remove some small trees, driving density lower. Stand density may also decrease with planned underburns due to fire-related injury and delayed mortality. Tree planting would increase stand density over time as trees grow and allow for control of species composition. These trees would eventually fill the available growing space over time due to the increase in sunlight, available nutrients and water,

and planting. The extra growing space is beneficial to small trees to provide a longer period for increased growth and resilience. Over the long-term, SDI would gradually increase as trees grow and begin to fill the available growing space. By the end of the projection period in 2060, if stands are left unmanaged, SDI/SDImax would exceed 55% (the point of self-thinning and imminent mortality). However, over the long-term, maintenance treatments such as thinning or prescribed burns would keep stand density within desired SDI/SDImax guidelines of approximately 15% to 35%.

Forest Health – Mortality

Mortality would occur through the direct cutting of trees during the planned timber harvest and whip felling operations. Indirectly, mortality could occur to the residual stand from logging damage or post-fire delayed mortality from underburn operations (Hood and Bentz 2007). Root rot and endemic insect activity would continue to contribute some amount of mortality to the stands in the project area, but these are likely to be reduced with the proposed activities in the area.[28]

Higher levels of mortality would occur directly with regeneration harvests than with commercial thinning initially. An indirect effect is the increase in small seedlings in regeneration harvests that would experience competition and self-thinning unless precommercial thinnings are used to keep seedling densities low at an early age (approximately 15 years, depending on site productivity).

Fire/Fuels

Prescribed Underburning Fuels Units and Harvest Units

There would be an immediate reduction in ground fuels, ladder fuels, and overstory following implementation of a prescribed fire. Some overstory mortality would occur during prescribed burning, especially in shade-tolerant/fire-intolerant tree species. Immediate and delayed reduction in live shrub/brush species, mid-story green trees, and short-term snag reduction would likely occur. Conversely new snags would be created with the introduction of fire. Surviving fire-tolerant tree species would become more fire resilient and may begin to self-prune lower branches as a fire response resulting in a crown fire potential reduction (Hood et al. 2018). Fire dependent species would become invigorated and may produce higher seed counts or growth starts.

Smoke would be produced and spread to surrounding areas. The smoke and reduced shrub layer may temporarily displace wildlife due to altered habitat conditions. Even with careful forethought and planning, prescribed underburning can be uncertain, and small, burned areas outside of the designated piled vegetation could occur. However, these "slop-overs" tend to be relatively small, suppressed with contingency resources, contained quickly, and should not cause substantial effects.

Long term forest health would improve as weaker or damaged trees are thinned by fire. The canopy would be thinned resulting in more sunlight reaching the ground. The additional sunlight

[28] The intent of management activities is to promote early seral, resilient tree species. Resiliency implies having thick bark trees resistant to fire, species less susceptible to root rot, and lower stocking levels that reduce inter-tree competition and stress.

would provide potential growing areas for grasses, other wildlife forage, tree seeding and improved growing conditions for shade-intolerant tree species. Firefighter and public safety would improve due to the reduction in fuels resulting in potentially less severe wildfires and creating a location from which to safely attack a wildfire. Potential wildfires would also produce less smoke since there would be less material available to burn. Wildlife habit including forage production, habitat trees, nesting/fawning habitat, potential winter range expansion, and re-invigoration of fire adapted biota, would improve over the long term (Block et al. 2016). Nitrogen-fixing shrubs, such as ceanothus species, are invigorated post-fire and result in improved nutrient cycling. During burning, organically bound nutrients in the soil are released and ash increases soil pH increasing the availability of nutrients.

Mechanical Piling and Pile Burning

Piling and burning immediately after harvest provides an immediate reduction in ground and ladder fuels throughout harvest units thereby lowering the fire severity by reducing fuel loads and the potential for fire to move into the tree canopy. Piles are usually burned in shoulder (wetter) seasons and control is more predictable than wildfire or underburning. Pile burning may result in soil heating, mineral soil exposure, understory and overstory mortality, tree crown and bole scorch, and duff consumption. The degree of each impact can be controlled by careful piling, proper location, ignition under the appropriate weather conditions and modification of ignition methods. Even with careful forethought and planning, prescribed burning can be uncertain, and small, burned areas outside of the designated piled vegetation could occur. However, these "slop-overs" tend to be relatively small, suppressed with contingency resources, contained quickly, and should not cause substantial effects.

Burning piles when conditions are favorable would result in less long-term smoke impacts as compared with severe wildfire smoke. The burned pile areas provide site preparation areas for natural regeneration or tree planting. After pile burning, the ability to suppress wildfire increases because it allows for incorporation of direct suppression tactics where firefighters can create a fireline adjacent to the flanking front (pinching off the spread and limiting the size of a wildfire) which results in lower fireline intensity. The activity of piling and burning near aspen or birch stands can also increase reproduction of these desired tree species. The equipment used to pile slash may result in mild soil compaction.

Mastication

Mastication can be used to reduce ladder fuels by converting smaller-diameter trees and shrubs into surface fuels and to convert coarse woody debris into smaller surface fuels that can be left on site. Reducing ladder fuels and increasing the height to live crown aids in reducing the risk of surface fire transitioning to crown fire (Agee and Skinner 2005). Masticated material may also act as a deterrent to seedling recruitment resulting in less future ladder fuels.

Masticated material, if left unburned, may lock up nutrients (nitrogen in particular) and slow decomposition in comparison to prescribed burning. Masticated areas may provide areas for firefighters to safely attack a fire. Treatment may result in mild compaction to soil.

Fire Regime Condition Class and Fire Regime

The treatment of these fuels would help move FRCCs away from their current departed condition (mainly FRCC 2) towards a more historically represented condition of FRCC 1. Moving stands towards FRCC 1 would produce more fire resilient timber stands, reduce ladder fuels, and increase initial attack effectiveness and fire engagement zones. (FRCC Guidebook 2010) As explained previously, the fire regime of an area is generally not something that can be changed in the short duration that this project encompasses; it can take many decades of sustained treatments and disturbances to alter a fire regime but the first step in moving towards a sustainable fire regime is moving and maintaining an FRCC 1 where possible. Historically, wildfires burned on the drier sites every 15-20 years, in patches ranging from 200 – 500 acres in size (Shellhaas, et. al. 2000). With 70-80 years of fire exclusion, it may require several mechanical and/or prescribed fire treatments to successfully restore this project area to its historic FRCC.

Wildland Urban Interface (WUI), Firefighter and Public Safety

Maintaining access in this project area for emergency firefighting personnel is critical for public and firefighter safety. Proposed unit locations and new Forest System roads would provide improved firefighter access and allow for more efficient fire suppression in those areas. Fuels treatments also increase access through the creation of openings which can allow for use by aerial firefighters and helicopters.

The proposed treatments would decrease fuel loading and overall potential fire severity on and adjacent to land designated as WUI in the CWPP and adjacent private ownerships. These treated areas would provide defensible zones in which firefighters would have a higher likelihood of success in suppressing wildfires that may threaten the designated WUI areas and adjacent private lands (Cohen 1999). Unless similar treatments are initiated and maintained on adjacent wildland ownerships, proposed fuel reduction treatments on NFS ownerships may have little effect reducing the threat of a severe surface and/or crown fire on private ownerships within the project area.

Air Quality

Smoke from prescribed fire activities may temporarily degrade air quality within the analysis area and nearby Pend Oreille River valley (e.g., Newport, Usk, Cusick). Utilizing prescribed burning and lessening the chance of uncharacteristic wildfire would reduce the long-term air quality risk. Potential impacts to air quality from prescribed fires would generally be lessened as compared with uncharacteristic wildfire fuel consumption within a given area by redistributing the emissions through meteorological scheduling and coordination with the WA DNR.

Prescribed burns would be scheduled and approved by the WA DNR during periods of good atmospheric dispersion (dilution), and when prevailing winds are forecasted to transport smoke away from sensitive areas (avoidance). This scheduling process includes proposed burns from state, private and federal ownership. In addition, total emissions from Sxʷuytn proposed activities would be spread out over a three- to fifteen-year implementation period.

Proposed activities meet or exceed the requirements of the Clean Air Act through compliance with air quality standards regulated by the WA DNR. Burn plans, outlining required weather and

fuel parameters for desired fire and smoke effects, would be prepared and approved for each prescribed burn. Prescribed burning would also be consistent with State laws requiring treatment of activity created fuels.

Socio-political considerations and/or unfavorable changes in transport winds may necessitate a curtailment in prescribed burning at the local level. Ignition cutoff points would be addressed in prescribed fire plans that are built for individual prescribed burn units. This would be determined on a case-by-case basis with a change in forecasted burn conditions communicated to the WA DNR. (NWCG[29], PMS 484 2017)

Table 12. Fire and fuels resource indicators and measures for the proposed action and no action

Resource Element	Resource Indicator	Measure	Existing Condition	Proposed Action	No Action
Wildland Urban Interface (WUI)	Potential defensible zones and fire engagement zones	Fuel reduction acres affecting designated WUI areas	1900 NFS acres known 865 acres Private and DNR under Land Owner Assistance grant program	20,200 acres of proposed fuels treatments would impact the WUI zone	WUI areas would remain untreated
Air Quality	Air Quality Index (AQI)	Days of AQI in healthy range during prescribed burning season. (April, May, September, October, November)	2019 AQI Data[30] 89.6% of days in "Green" air quality 10% in "yellow" air quality 0.4% in "orange" air quality 0 days in "red, purple, or maroon See Air quality section for details	Fuels treatments for up to 20,200 acres would not contribute to unhealthy long term (Red or below) AQI measurements	Uncharacteristic wildfire risk would increase therefore increasing likelihood of denigrated air quality days
Forest Health and Resiliency to Wildfire	Fuels treatments/ recent wildfire/ commercial harvest	Acres	2,126 direct fuels acres known. 13,280 acres of recent (1980 to present) wildfires	4,500 acres of natural hazardous fuels. treatment 15,700 acres of fuels treatment within commercial harvest units 800 acres mastication	No fuels treatments would occur. Hazardous fuels would continue to accumulate

[29] National Wildfire Coordinating Group

[30] There are 6 levels of Air Quality Index: Green (0-50, Good), Yellow (51-100, Moderate), Orange (101-150, Unhealthy for Sensitive Groups), Red (151-200 Unhealthy), Purple (201-300, Very Unhealthy), Maroon (301-500, Hazardous)

Resource Element	Resource Indicator	Measure	Existing Condition	Proposed Action	No Action
Firefighter and Public Safety	Potential fire engagement zones and access	Fuels reduction acres and new system road miles	Potential engagement zones and firefighter access are limited across project area	Commercial treatments of up to 24,400 acres. Fuels treatments for up to 20,200 acres	Firefighter access and defensible space would remain unchanged
Fire Regime Condition Class	Departure from historic fire regime	Degree of departure from historic fire regimes (FRCC 1-3)	FRCC 1- 24,046 acres FRCC 2- 38,716 acres FRCC 3- 21,326 acres	All treated acres would trend towards lower FRCC values	FRCC conditions would likely continue to depart/degrade from historic conditions

3.1.2 Cumulative Effects

Cumulative effects on vegetation are analyzed at the project scale. A scale as large as the entire CNF of 1.1 million acres would tend to obscure effects of treatments occurring on a localized area of the Forest. Vegetative cumulative effects are additive, meaning they are the total of changes of proposed treatments to vegetative structure. The project scale analysis allows for comparison of changes that are occurring as a result of the past, present, and reasonably foreseeable projects within the six watersheds. Effects of treatments occurring within the first 5 to 10 years would be considered as short term. Long term effects would be those occurring 11 to 50 years following treatments.

Past vegetative management activities on NFS lands are reflected in the existing condition. These treatments shifted forest structure to early and mid-open structures at the time. Most of these past treatments are now mid closed.

There are likely multiple timber sales that are active or planned within this area at this time across all other ownerships. Approximately 11,180 acres of harvest on non-Forest Service lands have occurred in the last ten years on other ownerships (forest practices regulated by the WA DNR) and 650 acres on the Kalispel Reservation. These WA DNR regulated harvests were mostly in the form of created openings such as clear cuts, Tower Fire salvage or other regeneration treatments while the Reservation harvests were all commercial thin with group selections.

No additional vegetation treatment projects are scheduled for NFS lands within the project area besides activities planned in this project. However, continued dispersed recreation and firewood gathering are anticipated to be ongoing and reasonably foreseeable future activities. None of these activities add to the cumulative effects on vegetation since the effects are small and localized to forest structure, stand density, and mortality trends.

Forest Structure

Treatments on other ownerships amount to about 13 percent of the total area of the six Sxʷuytn watersheds. Treatments on state and private land generally changed forest structure to early and mid-open stand structures.

Harvests on other land ownerships may or may not allow trees to grow into these structure stages in the foreseeable future, depending on their forest management objectives. Projects on NFS lands would move toward HRV, but the amount and types of treatment on non-NFS lands may limit the extent of change at the watershed level.

Stand Density (BA, TPA, SDI)

Since there are no other vegetation management projects scheduled in the foreseeable future on NFS lands, there would be no cumulative effects related to stand density.

Mortality

Commercial treatments and precommercial thinning treatments would cumulatively reduce the impacts from potential stand-replacing disturbance on up to two-thirds of the project area. Actions across all ownerships would increase the initial volume loss through the direct harvest of trees on approximately 61,000 acres within these watersheds within the past and the foreseeable future. Volume gains through reinvigorated growth would continue to rise over the long-term across all ownerships while volume loss to mortality and disturbance is minimized by past, current, and planned actions. High intensity, high severity wildfire would be minimized, thus decreasing overall tree mortality across the landscape if these treatments act as barriers and aid in fire suppression. More growing space due to thinning would provide light and nutrients for remaining trees to increase crown ratio and diameter growth.

Fuels Treatments

Treatments within the project area would move the area faster toward HRV if private landowners continue to conduct fuels reduction work around structures and property boundaries and treatments are maintained over time.

Adjacent NFS, Tribal, and WA DNR lands are in similar stand conditions, and these agencies are continually developing and implementing fuels reduction projects. The combination of the Proposed Action alternative and other agencies' and landowners' fuels reduction efforts are anticipated to decrease risk of uncharacteristic wildfire in and adjacent to the project area.

Summary

Treatments would meet the purpose and need by:

- Moving stands towards the HRV by vegetation type, structure, pattern and density over time. In the short-term, treatment would focus on mid-closed stands. In the long-term, forest structure is expected to also change due to insects, disease, and wildfire, but to a lesser degree with proposed activities.
- Thinning stands to increase resiliency and resistance (not eliminate) to disturbance agents as implemented and over time. Proposed activities would reduce fuels and stand

densities, change species composition in some cases, and maintain more characteristic open densities to increase tree vigor by reducing competition for resources.

See Table 11 for comparison of metrics by alternative.

3.2 Aquatics

The following is a summary of the Sxʷuytn Aquatics analysis (Lawler, et. al. 2020).

Surface water resources on the Forest include streams, springs, seeps, wetlands, riparian areas, lakes, ponds, and reservoirs. Each contribute to habitat for terrestrial wildlife, fisheries, and fauna; natural water purification processes; flood control; aesthetic resources; and to agricultural and recreational uses.

The Sxʷuytn project area is located in the Middle, CeeCeeAh, Cusick, Skookum, Exposure, and Davis Creek subwatersheds. These subwatersheds are within the Pend Oreille Basin HUC (Hydrologic Unit Code) 6 and Pend Oreille River HUC 8. Since there are no proposed actions within the Davis Creek subwatershed, the subwatershed was not analyzed in detail.

Methodology

This assessment of environmental consequences relies on relevant scientific literature, field observations, corporate data, field survey data, monitoring data and observations from similar past projects, and professional judgment based on experience.

Methodology and assumptions for fish habitat are based on data collected during the Forest's Level II stream habitat surveys. The Kalispel Tribe of Indians and Forest Service field crews collected data as a joint effort on fish bearing streams on both NFS and non-NFS lands during the summer 2019. Data collected on NFS lands was used to complete direct and indirect effects analysis. The analysis area was expanded to include non-NFS lands to analyze cumulative effects within the subwatersheds.

Watershed Condition Framework[31] (WCF) provides a scoring system to rate the health and function of each subwatershed. The Forest Plan[32] directs us to analyze conditions at the subwatershed scale. This report uses the WCF technical guide to develop a subwatershed function score which allows comparison of existing condition to post-project projections. The Forest Plan guideline also directs projects to maintain properly functioning subwatersheds and restore or maintain impaired and functioning, but at risk, subwatersheds. Short term adverse effects are acceptable when supporting long term recovery of aquatic and riparian desired conditions.

Within the context of the WCF, the three watershed condition classes are directly related to the degree or level of watershed functionality or integrity:

[31] The WCF established a nationally consistent reconnaissance-level approach for classifying watershed condition, using a set of indicators that are surrogate variables representing the underlying ecological, hydrological, and geomorphic functions and processes that affect watershed condition. Primary emphasis is on aquatic and terrestrial processes and conditions that Forest Service management activities can influence.

[32] Forest Plan Forestwide Guideline FW-GDL-WR-01 Properly Functioning Watersheds

1. Class 1 = Functioning Properly
2. Class 2 = Functioning at Risk
3. Class 3 = Impaired Function

WCF characterizes a watershed in good condition as one that is functioning in a manner similar to natural wildland conditions.

A Class 1 watershed is considered to be functioning properly if the physical attributes are adequate to maintain or improve biological integrity. This consideration implies that a Class 1 watershed that is functioning properly has minimal undesirable human impact on its natural, physical, or biological processes, and it is resilient and able to recover to the desired condition when disturbed by large natural disturbances or land management activities.

A Class 2 watershed is considered to be functioning at risk if the physical attributes are with moderate geomorphic, hydrologic, and biotic integrity relative to natural potential condition and are susceptible towards not maintaining biological integrity.

A Class 3 watershed has impaired function because some physical, hydrological, or biological threshold has been exceeded. Substantial changes to the factors that caused the degraded state are commonly needed to return the watershed to a properly functioning condition.

The overall watershed condition score is computed as a weighted average of four process category scores. The watershed condition scores are tracked to one decimal point and reported as Watershed Condition Classes 1 (scores from 1.0 to 1.6), 2 (scores from 1.7 to 2.2), or 3 (scores from 2.3 to 3.0).

Table 13. - WCF categories and ratings for existing condition

Subwatershed	Aquatic Physical Total	Aquatic Biological Total	Terrestrial Physical Total	Terrestrial Biological Total	USFS Condition Rating	USFS Watershed Condition Class
Middle Creek	1.8	1.9	2	1.8	1.9	Functioning at Risk
Cusick Creek	1.3	1.8	2	1.8	1.7	Functioning at Risk
CeeCeeAh Creek	2	1.9	2.3	1.8	2	Functioning at Risk
Skookum Creek	2	1.8	2.5	1.8	2.1	Functioning at Risk
Exposure Creek	1.7	1.8	2.5	1.8	2	Functioning at Risk

Note: Ratings for Cusick, Middle, and Exposure creek subwatersheds apply only to the portions east of the Pend Oreille River.

Threatened and Endangered Aquatic species

The project area is entirely included within the boundaries of Pend Oreille County, Washington. For this county, the USDI[33] Fish and Wildlife Service presently lists one species, Bull Trout, as

[33] USDI = United States Department of the Interior

threatened under the Endangered Species Act of 1973[34] . The Columbia Headwaters Recovery Unit includes western Montana, northern Idaho, and the northeastern corner of Washington. Bull Trout populations and critical habitat assessed are in Indian and Mill creeks, which is part of the Lower Clark Fork geographic area and Lake Pend Oreille Core Area.

Existing Population Condition

Viable populations of Bull Trout do not exist in Mill Creek and Indian Creek and the species is generally not present within the basins. Mill Creek and Indian Creek flow into the Pend Oreille River with approximately 4 miles and 2.1 miles of Bull Trout critical habitat respectively. The LeClerc Road crossing at the mouth of Indian Creek was replaced in 2019 with a bridge to facilitate fish passage. The critical habitat in the Pend Oreille Core area was tested by the CNF using environmental DNA sampling in the summers of 2015, 2016, 2018, and 2019. Bull trout DNA were detected in Mill Creek (2016), however, since then, tests have yielded negative results. Bull Trout have been found at the mouth of Indian Creek via boat shocking. Recent encounters have been confined to the confluence areas of Indian and Mill Creeks with the Pend Oreille River.

3.2.1 Direct and Indirect Effects

Subwatersheds (6th level HUC) are the appropriate boundary and scale for assessing aquatic resources since water and erosional process move down channel and downslope and fish travel throughout the system, up and down stream.

Table 14 identifies the WCF ratings by category following implementation of the proposed action.

Table 14. - WCF categories and projected ratings post project implementation

Subwatershed	Aquatic Physical Total	Aquatic Biological Total	Terrestrial Physical Total	Terrestrial Biological Total	USFS Condition Rating	USFS Watershed Condition Class
Middle Creek	1.5	1.6	2	1.6	1.7 (-0.2)	Functioning at Risk
Cusick Creek	1.3	1.5	2	1.6	1.6 (-0.1)	Properly Functioning
CeeCeeAh Creek	1.7	1.6	2.3	1.6	1.9 (-0.1)	Functioning at Risk
Skookum Creek	1.7	1.6	2.5	1.6	1.9 (-0.2)	Functioning at Risk
Exposure Creek	1.5	1.6	2.5	1.6	1.9 (-0.1)	Functioning at Risk

Note: Ratings for Middle, Cusick and Exposure creeks apply only to the portions of those subwatersheds east of the Pend Oreille River.

[34] https://www.fws.gov/wafwo/articles.cfm?id=149489611

Bull Trout

Mill Creek (within Middle Creek subwatershed) and Indian Creek (within Exposure Creek subwatershed) are within the core area and designated as critical habitat. Nearly all critical habitat in Mill Creek flows on Forest Service lands, while critical habitat in Indian Creek flows on both Forest Service and Kalispel Tribal Land. Indian Creek critical habitat is officially designated from the headwaters of the basin to the mouth, however actual surface flow of the creek originates in Section 16 at the wetlands on DNR land. Therefore, only 0.6 miles of Indian Creek designated critical habitat actually contains surface flow and only 0.2 miles of that surface flow passes through NFS lands (Section 17). Proposed actions of this project, therefore, are expected to have very little effect on Indian Creek Bull Trout critical habitat.

Primary Constituent Elements Summary: Mill Creek and Indian Creek

The primary constituent elements (PCEs) for Bull Trout are those habitat components essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal genetic exchange, or sheltering. Based on the PCE and WCF effects analysis for this project, the proposed actions would have No Effect on Bull Trout and May Affect, but are Not Likely to Adversely Affect designated Bull Trout Critical Habitat.

The Mill Creek and Indian Creek drainages each represent less than 0.1 percent of total critical habitat in the critical habitat unit. While some effects on Bull Trout critical habitat are expected at the local level, no adverse effects are expected. The majority of the effects on PCEs would come from improvements to habitat and barrier removal.

There may be some short-term negative impacts in the Mill Creek and Indian Creek drainages from road construction and decommissioning activities, but there are long term benefits from large woody debris placement, riparian thinning, and barrier removal. The proposed action would improve baseline conditions in the drainage at specific locations over the long-term, though not to the extent so as to improve PCE ratings for critical habitat in the drainage as a whole. The project should maintain the aquatic system in a portion of the critical habitat unit.

Table 15. - Summary of effects determination for fish species

Species	Status	Project Area Occurrence	Rationale for determination
Bull Trout	Threatened	No	On the basis of the evaluation, implementation of the proposed action and associated standard practices would have **No Effect** to Bull Trout. This is due to the very low number (or absence of) Bull Trout known to occur in project area waters. There is little to no potential for incidental take. The Sxʷuytn Project would not contribute to a negative trend in viability of Bull Trout.

Species	Status	Project Area Occurrence	Rationale for determination
Bull Trout Critical Habitat	Threatened	Yes	Implementation of the proposed action and associated standard practices **May Affect, is Not Likely to Adversely Affect** Bull Trout critical habitat. Potential short-term sediment inputs from watershed restoration projects is possible, but these projects would result in long-term Beneficial Effects for Critical Habitat in Mill Creek and Indian Creek. The Sxʷuytn Project would not contribute to a negative trend in Bull Trout Critical Habitat.
Westslope Cutthroat Trout	Sensitive and Management Indicator Species	Yes	Implementation of the proposed action **May impact individuals or habitat, but is not likely to result in a trend toward federal listing**, and continued viability is expected. The project is not expected to prevent attainment of riparian management objectives as described in the Inland Native Fish Strategy, provided the standard practices are implemented as included in Appendix B.
Kokanee	Management Indicator Species	Yes	Implementation of the proposed action **May impact individuals or habitat, but is not likely to result in a trend toward federal listing**, and continued viability of the Bead Lake population is expected. The project is not expected to prevent attainment of riparian management objectives as described in the Inland Native Fish Strategy, provided the standard practices are implemented as included in Appendix B.
Pygmy Whitefish	Sensitive	Yes	Implementation of the proposed action **May impact individuals or habitat, but is not likely to result in a trend toward federal listing**, and continued viability of the Bead Lake population is expected. The project is not expected to prevent attainment of riparian management objectives as described in the Inland Native Fish Strategy, provided the standard practices are implemented as included in Appendix B.
Umatilla Dace	Sensitive	No	Not present, no impact.
Lake Chub	Sensitive	No	Not present, no impact

3.2.2 Cumulative Effects

No additional NFS projects were identified for the reasonably foreseeable future within the project subwatersheds. Proposed harvest and road construction on non-NFS lands would result in less than 25% of the individual subwatersheds affected and effects on water yield would remain

unmeasurable. As barrier culverts on non-federal lands are replaced with aquatic organism passage structures, habitat connectivity would improve. Upgraded stream crossings and road maintenance on non-NFS lands would further reduce road-generated sedimentation delivery to the streams and result in overall improvement of the subwatershed stream network. Suppression of brook trout across ownerships within Mill Creek drainage would continue to reduce an invasive species population.

Within the project subwatersheds no projects were identified on non-NFS lands during the analysis for large wood placement, channel restoration work (other than passage barriers), or riparian vegetation management. Therefore, there are no cumulative effects for these aquatic resource indicators.

All activities included in the proposed action for CeeCeeAh, Cusick, Exposure, Middle and Skookum Creek subwatersheds would meet 2019 Forest Plan direction for water quality management provided standard practices and Best Management Practices[35] listed in the environmental assessment are fully implemented.

3.3 Wildlife

This is a summary of the Sxʷuytn Wildlife Specialist Report (Borysewicz 2020). Based on the purpose and need (Chapter 1) and public scoping comments for this project, this section focuses on Northern Goshawk, deer and elk habitats, and threatened and endangered terrestrial wildlife. Information related to sensitive, surrogate and landbird species is in Appendix C and the project record.

3.3.1 Species of Management Interest: Deer and Elk

On the CNF, deer and elk are species of management interest due to their high importance for hunting, viewing and photographing. Special monitoring and management are required to maintain habitat to support stable populations (Gaines et al. 2017).

Existing Conditions

NFS lands in the project area tend to be "cover-rich" and lacking in open, productive foraging sites, relative to historic conditions. Private and state timber lands in the project area tend to have higher percentages of open canopy stands, due to timber harvest that occurred in the last two decades. Approximately 11,188 acres (27 percent) of the non-NFS lands on winter range are providing open foraging sites, while approximately 2,087 acres (13 percent) of the winter range on NFS lands are providing open foraging habitat.

Direct and Indirect Effects

Summer and Winter Range Cover and Forage - Timber harvest and post-harvest fuels treatments would reduce surface fuels and continuous fuel ladders. Future wildfires that occur in harvested

[35] Best Management Practice (BMP) means a practice, or combination of practices, that is determined to be an effective and practicable means of preventing or reducing the amount of sediment or pollution generated by nonpoint sources to a level compatible with water quality goals per the national best management technical guide and the Clean Water Act.

areas would be more likely to burn cooler and would have fewer pathways to ascend into the overstory tree crowns.

Winter Range Forage Productivity – Timber harvest on big game winter range would improve growing conditions for existing forage plants due to the increase in available light and reduced competition for site resources. These effects would be most pronounced where timber harvest creates openings in the forest canopy.

Roadside Hiding Cover - Patches or strips of vegetation that can provide hiding cover for elk would be retained between created forest openings (shelterwood harvest) and open roads, where feasible[36].

Human Activities - While the project is active, unauthorized motorized travel would be prohibited on all new roads, un-drivable roads opened up for the project, and existing restricted (gated) roads. Post-project, these roads would be effectively closed with native materials (ex., earthen berms) or existing gates. Approximately 7 miles of currently open roads would be closed to public use. Thus, the Proposed Action would move the project area towards the Forest Plan Desired Condition *FW-DC-WL-14. Deer and Elk Habitat - Human Activities*. Table 16 displays the post-project acres within 0.25 mile of open roads and motorized trails.

Table 16. Post-project acres influenced by open motorized routes on deer and elk ranges (NFS lands)

Habitat Component (NFS lands)	Existing Condition acres within open road influence zone	Proposed Action acres within open road influence zone	Forest Plan Desired Condition
Winter range [a]	7,153 (43%)	7,069 (43%)	<30% of the winter range
Summer range [b]	22,091 (55%)	21,936 (54%)	<50% of the summer range

[a] Values reflect road systems physically closed (gated) in the winter to provide big game security. These seasonally closed road systems include: Furport (FR 1914), CCA Creek (FR 1900016), Sandwich Creek (FR 1900041), and Papoose (FR 5000032).

[b] Summer range includes areas mapped as winter ranges, since deer and elk utilize these areas year-round. Animals are more dispersed during the summer months.

Although the post-project acres within open road influence zones would be somewhat reduced from the current condition, the level of human influence would remain high.

Disturbance to Wintering Big Game - In order to reduce the potential for disturbance to big game, timber harvest and other project activities would be prohibited in units accessed by roads that are seasonally closed (December 1 to March 31) on the designated winter range during the closure period. This action should provide animals the opportunity to displace to large, secluded areas if they are disturbed by equipment operations, consistent with Forest Plan Guideline *FW-GDL-WL-13. Mule Deer, White-tailed Deer and Elk Habitat - Human Activities*.

[36] Forest Plan Guideline FW-GDL-WL-01. Hiding Cover for Wildlife

The alternatives as proposed may impact habitat and individual animals but should not contribute to a negative trend in viability of big game populations on the forest.

Cumulative Effects

A characterization of cumulative effects to big game animals can be made at the forest-wide scale.

As is the case with the Sx^{w}uytn project, other forest management projects proposed on NFS lands would be intended to move deer and elk ranges towards the desired conditions stated in the Forest Plan. Timber harvest and fuels reduction treatments would be designed to move big game ranges towards their historic wildlife habitat patterns. This would generally have the effect of creating more open foraging habitats on the forest over time, particularly in the drier vegetation types. The Sx^{w}uytn project, and other forest management projects on NFS lands, would cumulatively reduce open road densities in watersheds where these densities are presently high.

The Sx^{w}uytn project would complement the suite of big game habitat improvements the Forest has completed or proposes to complete across the forest. These projects include prescribed burning of upland shrublands to rejuvenate browse, eradicating noxious weeds on roadsides, fields and meadows, and protecting aspen and riparian vegetation from livestock browsing. Such projects are designed to promote the vigor, productivity and palatability of forage plants utilized by big game.

Equipment operation required to complete the Sx^{w}uytn project could contribute to the spread of noxious weeds on the forest. To minimize this potential, the Forest Service would continue to manage noxious weeds under the CNF 1998 Environmental Assessment for Integrated Noxious Weed Treatment. Active noxious weed management will be necessary so long as forest management, grazing, and forest recreation continues.

State and private lands within the forest boundary are unlikely to be managed with the needs of big game in mind. Managing to move towards the historic wildlife habitat patterns for vegetation is unlikely to be a consideration. Noxious weeds could increase on state and private timber lands over time, due to varying levels of resources available for prevention, treatment, and monitoring.

3.3.2 Northern Goshawk Nesting Habitat (Forest Plan Focal/Management Indicator Species)

Methodology

The Sx^{w}uytn project area was surveyed for active goshawk nests in 2019 based on protocol established by Woodbridge and Hargis (2006). The focus was on areas with less than 40 percent slope and stands in mid-closed and late closed structural stages. During these surveys, three active goshawk nests and one Cooper's hawk nest were located. A nest stand of at least 30 acres around each of the three goshawk nests was mapped. Post-fledgling areas (nest stand and five alternate nest stands) were mapped at roughly 420 acres each.

The potential reproductive habitat for goshawks in the Sx^{w}uytn project area was mapped based on data collected during wildlife habitat surveys, the forest's Vegetation Type GIS layer, and

LiDAR data related to tree species, tree sizes, canopy layers, and canopy closure. The same variables were applied to the historical vegetation data generated through the Interior Columbia Basin Ecosystem Management Project (Wisdom et al. 2000) which was based on historical photo interpretation. Where photo interpretation was not available, the same variables were inserted into a State - Transition model that accounts for historic fire regimes and provides historic habitat values specific to a watershed or landscape. Lastly, the current and historic habitat levels were compared to determine the departure for this habitat from historic conditions by 6th field watershed.

Table 17 compares the current condition of goshawk reproductive habitat with the historic range of habitat values, by watershed. Primary and secondary habitat acres, by percent, are combined to establish the percent of historic range currently present.

Table 17. Comparison of current suitable goshawk habitat to historic conditions on NFS lands in the Sxʷuytn Project Area. (*All values are approximate.*)

6th Field Watershed	NFS Acres	Primary Habitat Acres (%) [a]	Secondary Habitat Ac. (%) [b]	Historic Range of Habitat (%)	Current Condition
Middle Creek (21,763 acres)	5,073	1,043 (21)	1,037 (20)	47-58	Below historic patterns
Cee Cee Ah Creek / Cusick Creek (24,397 acres)	8,084	1,293 (16)	2,021 (25)	34-44	Within historic patterns
Skookum Creek / Davis Creek (35,745 acres)	14,142	1,188 (8)	6,307 (45)	31-41	Above historic patterns
Exposure Creek (21,586 acres)	13,154	3,238 (25)	4,654 (35)	31-40	Above historic patterns

[a] Primary Habitat = mapped nest stands, alternate nest stands, and potential habitat in the mesic vegetation types.

[b] Secondary Habitat = potential habitat in the Douglas fir, Dry Vegetation Type.

Direct and indirect Effects

No Change

Large tree habitat and late structural stage stands would be recruited in the project area according to natural processes. It is unlikely that over-stocked, stagnated stands of small diameter trees would ever produce significant numbers of large trees. Large trees growing in over-crowded stands would continue to become more susceptible to mortality from insect and disease attack and drought stress.

With ongoing fire suppression, young trees would continue to in-fill forest stand understories. Fire-intolerant tree species would continue to colonize areas in which they were historically

excluded by fire. Surface fuels would continue to accumulate. Fuel "ladders" from the stand understories into overstory tree crowns would continue to develop. These incremental processes would tend to increase the risk of stand-replacing fires occurring in the area over time. Such fires could remove entire nest stands for goshawks. Effective foraging habitat (forest mosaics with much concealing cover) could be reduced on a landscape scale. If future fires burn with lower intensity, they could improve habitat conditions for goshawks by clearing out dense stand understories and fostering the growth of understory plants that provide food resources (buds, green forage, seeds, berries) for many prey species.

Proposed Action

Timber harvest, prescribed burning and mechanical site preparation would all reduce ground fuels and continuous fuel ladders. These treatments would tend to slow the spread of fires occurring in the area and reduce the pathways for fire to ascend into the overstory tree crowns. Thus, the risk of high-intensity fires removing large acreages of suitable goshawk nesting habitat would be reduced.

Active Nests - Within the Sxʷuytn project area, the three mapped goshawk nest stands, and all alternate nest stands would be reserved from harvest and fuels treatments. This would equate to at least 180 acres of habitat left unmanaged around each known active nest. It is possible a new goshawk nest could be found during future surveys or by forest workers laying out harvest unit boundaries or marking trees. In this event, the district biologist would map a nest stand and alternate stands and manage them as directed by the Forest Plan.

Nest Disturbance – Design elements (Chapter 2) include a timing restriction on project activities within 0.25 mile of active nests to ensure that nesting birds and their young are not disturbed, consistent with Forest Plan Standard *FW-STD-WL-01. Nest Sites*.

Potential Nesting Habitat - It is important to note that boundaries of the mapped "primary" and "secondary" habitat polygons could be modified or fine-tuned as a result of further field review in order to ensure they best meet the definitions for these habitats. Mapped habitat polygons where the overhead canopy is likely to be severely degraded over the short-term due to insect and disease attack could be swapped out for stands with more vigorous appearing trees in consultation with the wildlife biologist.

Vegetation management within primary habitat for goshawks would occur *only* as necessary to maintain desired habitat conditions for goshawks, as determined by the wildlife biologist and approved by the District Ranger. Primary habitat includes 180 acres mapped around each known active nest (the 30-acre nest stand and 5 alternate nest stands) plus all the currently suitable reproductive habitat in the mesic vegetation types.

Within stands proposed for commercial thinning, overhead canopy closure, crown complexity, and crown bulk density would be reduced, decreasing their potential to support nesting by goshawks. These effects would likely last 15-20 years, until growing tree crowns start to close once again. Thinning would concentrate growth on the largest, most vigorous appearing trees. A growing body of research has shown that thinning reduces the inter-tree competition for sunlight, water, and soil nutrients in the harvested stand (Oregon Dept. of Forestry 2008). Therefore, this

harvest prescription can be used to accelerate the development of large diameter trees (Bailey and Tappeiner 1998, Dodson et al. 2012) that are preferred nest sites for large raptors.

Within watersheds that are currently within or above historic wildlife habitat patterns for goshawk habitat, silvicultural treatments in secondary habitat could occur to accomplish other resource objectives, so long as the total habitat was not reduced below HRV. These treatments could be designed to move late closed stands to a late open condition - a structural stage that is below HRV for vegetation in the Douglas fir - Dry Vegetation type. The late open structural stage would normally provide insufficient overhead canopy to be selected by goshawks for nesting. However, these open, parklike stands provide suitable habitats for other sensitive species such as white-headed woodpeckers.

Table 18 compares not taking action and the Proposed Action Alternative in relation to reproductive habitats for goshawks.

Table 18. Comparison of project alternatives related to goshawk habitat on NFS lands in the Sx^{w}uytn Project Area. (All values are approximate.)

6th Field Watershed	NFS acres	Historic Habitat Acres %	Current Condition on NFS lands	No Action Goshawk Habitat [a] Acres (NFS)	Proposed Action Managed Habitat Acres
Middle Creek	5,070	47-58	Below historic patterns	1,040 (primary) 1,040 (secondary)	All 1,040 acres of secondary habitat available for thinning. Retain some resource values for goshawks in harvest units (e.g., large trees, tree clumps, > 50% canopy closure overall).
Cee Cee Ah Creek / Cusick Creek	8,080	34-44	Within historic patterns	1,290 (primary) 2,020 (secondary)	All 2,020 acres of secondary habitat available for thinning. Retain some resource values for goshawks. Treatments may be applied on up to 566 acres of secondary habitat to accomplish other resource goals (7% of NFS lands).
Skookum Creek / Davis Creek	14,140	31-41	Above historic patterns	1,190 (primary) 6,310 (secondary)	All 6,310 acres of secondary habitat available for thinning. Retain some resource values for goshawks. Treatments may be applied on up to 3,111 acres of secondary habitat to accomplish other resource goals (22% of NFS lands).

6th Field Watershed	NFS acres	Historic Habitat Acres %	Current Condition on NFS lands	No Action Goshawk Habitat [a] Acres (NFS)	Proposed Action Managed Habitat Acres
Exposure Creek	13,150	31-40	Above historic patterns	3,240 (primary) 4,650 (secondary)	All 4,650 acres of secondary habitat available for thinning. Retain some resource values for goshawks. Treatments may be applied on up to 3,815 acres of secondary habitat to accomplish other resource goals (29% of NFS lands).
Totals	40,450	NA	NA	6,760 (primary) 14,020 (secondary)	All 14,020 acres of secondary habitat available for thinning (35% of NFS lands). Retain some resource values for goshawks in harvest units. Treatments may be applied on up to 7,490 acres of secondary habitat to accomplish other resource goals (19% of NFS lands).

[a] *Primary Habitat* = mapped nest stands, alternate nest stands, and potential habitat in the mesic vegetation types.
Secondary Habitat = mapped potential habitat in the Douglas fir, Dry Vegetation Type.

Within-stand Structures - Within all proposed harvest units, live trees that are 20+ inches in diameter would be retained (not cut) unless there is a clear silvicultural reason why the removal of smaller trees alone cannot achieve the desired conditions. All snags that are 10+ inches in diameter would be retained in harvest units to the extent feasible. Any trees with old raptor nest platforms would be retained. Up to 12 trees per acre that are 14+ inches in diameter and that have broken-tops, broom rusts, or mistletoe brooms, would be retained. Down logs would be retained consistent with Forest Plan Desired Condition *FW-DC-VEG-01. Snags and Coarse Woody Debris*. Thus, the great majority of the existing structures that goshawks might select for nesting or prey preparation should still be available in the harvested units.

The alternative as proposed may impact individual birds but would not affect the continued viability of goshawk populations on the forest.

Cumulative Effects

The cumulative effects area is the Colville National Forest. Of all the projects and activities that occur on the forest, timber sales by far have the greatest potential to cumulatively affect goshawks. The forest-wide assessment of species viability (Gaines et al. 2017) identified management considerations for goshawks across the Okanogan-Wenatchee and Colville National Forests. Standard practices (Appendix B) and design elements (Chapter 2) included as part of

this alternative would address these issues and considerations. All other timber sales on NFS lands on the forest would incorporate similar practices and elements.

Effects Summary

Table 19 displays the degree to which each project alternative responds to the resource indicators for the key wildlife issues and topics.

Table 19. Comparison of Proposed Action and taking no action in relation to the wildlife issues and topics. (All values are approximate and apply to NFS lands only.)

Resource Indicator	Measure	Current condition	Proposed Action
Suitable reproductive habitat for goshawks	Acres of primary habitat (mapped active and alternate nest stands plus potential nesting habitat in mesic vegetation types)	6,760 acres	6,760 acres
	Acres of secondary habitat (Douglas fir -Dry Vegetation Type) maintained through thinning	0 acres	Up to 14,020 acres of secondary habitat thinned while maintaining > 50 percent canopy closure
Deer and elk winter range forage	Acres of created openings (shelterwood harvest)	2,090 acres existing openings (13 % of winter range)	1,040 acres additional openings (+6 percent)
	Acres enhanced by under-burning (outside of harvest units)	0 acres underburned	Up to 2,400 acres of shrublands and open woodlands underburned
Seclusion for deer and elk	Percent of winter and summer ranges within a zone of influence of an open road (0.25 mile).	43 % winter range, 55 % summer range	43 % winter range, 54 % summer range (post-project)

3.3.3 Threatened and Endangered Terrestrial Wildlife Species

The following is a summary of the Sxʷuytn Wildlife Biological Evaluation (Borysewicz 2020).

The Sxʷuytn project area is entirely included within the boundaries of Pend Oreille County, Washington. For this county, the USDI Fish and Wildlife Service presently lists five terrestrial wildlife species as threatened or endangered under the Endangered Species Act of 1973 (USFWS 2020). Presently there is one candidate species[37] for listing under the Endangered Species Act. Table 20 displays information for each of these species relative to the project area.

[37] The USFWS withdrew the proposed rule to list the wolverine as a threatened species October 13, 2020 (78 FR 7864). The wolverine is addressed in the sensitive species section of the wildlife report.

Table 20. Threatened (T), endangered (E), proposed (P) and candidate (C) species listed for the CNF (Species in shaded blocks are addressed in this report).

Species	Status	Habitat present?	Documented in the area?	Habitat description / other comments
Canada lynx (*Lynx canadensis*)	T	Yes	Yes	In northeast Washington, lynx occupy higher elevation forests (above 4,100 feet). The Selkirk Mountains (including the Sxʷuytn project area) are classed as a "secondary area" for lynx (Interagency Lynx Biology Team 2013). Snowshoe hares are the primary prey of lynx. Hares require low, concealing cover such as that provided by dense, young stands of lodgepole pine, other conifers, or mixed conifer / hardwood stands. Mature timber stands with dense understories are also used. Other considerations include habitat connectivity and seclusion from human disturbance (Ruediger et al. 2000, Interagency Lynx Biology Team 2013).
grizzly bear (*Ursus arctos*)	T	Yes	Yes	The project area is located outside of the Selkirk Mountains Grizzly Bear Recovery Zone. However, suitable habitat for grizzly bears is present in the area and grizzlies have occurred there. Spring foraging habitats include low to mid-elevation riparian areas, meadows, parklands. Summer - fall foraging sites include mid-high elevation, berry producing shrubfields, montane meadows, and riparian areas. Grizzlies often den in alpine or subalpine areas with deep soils. Seclusion from human disturbance is a primary management objective (USDI et al. 1986, USDI 1993).
woodland caribou (*Rangifer tarandus caribou*)	E	No	No	Woodland caribou inhabit mature montane forests of western redcedar - western hemlock, and subalpine fir - Engelmann spruce above 4,000 feet in elevation (USDI 1994, USDA 2019). The project area is located outside of the Selkirk Mountains Woodland Caribou Recovery Area. The project area is outside the range of this caribou herd.
yellow-billed cuckoo *(Coccyzus americanis)*	T	Yes	No	This species requires river floodplains that support dense willow and cottonwood stands (WDFW 2004).

Canada Lynx Habitat

Methodology

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, the Washington Department of Natural Resources Natural Heritage Program, and the CNF were reviewed. Also reviewed were environmental assessments of past CNF projects completed in the area and documentation of past species-specific wildlife surveys completed in the area.

Potential den habitat and foraging habitat components within lynx range were mapped using data collected from stand exams, LiDAR imagery of tree heights and canopy closure, the forest's recently completed GIS layer of vegetation types, and aerial photo interpretation. Suitable habitat components are patchy and often isolated.

Existing Conditions

There are no known active or historic lynx den sites in the Sxʷuytn project area. The last confirmed lynx detection in Pend Oreille County was in 2008 (Lewis 2016). From 2014 to 2019, the Kalispel Tribe set up 27 baited winter camera stations within the Sxʷuytn project area, but this effort did not yield any lynx detections. Other systematic survey efforts in the area conducted by multiple agencies also failed to detect lynx (Base and Loggers 2008, Lewis 2016, Lucid et al. 2016).

Approximately 6,941 acres (49.5%) of the lynx range are within the mapped perimeter of the 2015 Tower Fire. This fire burned with mixed severity, resulting in a mosaic of trees killed in large swaths, trees killed in patches or clumps, and unburned areas. Where this fire burned with high severity, it created large openings that lynx would be reluctant to cross due to the lack of concealing cover. These open areas are currently classified as unsuitable habitat for lynx. Most accessible acres on non-NFS ownerships were salvage logged within a year of the fire and presently support few standing snags. NFS lands that were not salvage logged within the fire perimeter contain large numbers of standing snags, depending on the burn severity. Most of these trees are small snags (10 to 19.9 inches in diameter).

Direct and Indirect Effects

Commercial thinning would occur over approximately 940 acres of timber stands in middle structural stages on the lynx range. These stands typically lack large trees, dense understories, and concentrations of coarse woody debris. Thus, they do not appear to be providing important habitat components for lynx. The intent of thinning these stands would be to reduce inter-tree competition to improve stand health and resiliency to insect and disease attack. Un-thinned "skips" would be reserved in the harvested units. Areas of denser canopy would be maintained within riparian management areas. Understory vegetation in the harvested stands would likely become more robust over the short to mid-term, providing additional concealing cover for dispersing lynx. Areas of recent timber harvest or burns can provide herbaceous summer forage for snowshoe hares, and winter browse on older sites (Fox 1978, in Interagency Lynx Biology Team 2013).

Prescribed fire would be applied on approximately 50 acres of the lynx range. These sites are more open and are mostly not providing good cover for snowshoe hares. The fires would kill conifer regeneration and the above-ground portions of hardwood trees and shrubs. The affected hardwoods and green forage plants should quickly respond to burning with profuse basal or root sprouting. Snowshoe hares could take advantage of this new, nutritious food resource dependent on the amount of low overhead cover that develops post-burning.

Multi-storied Stands - No project activities would occur within stands that are mapped as potential lynx den habitat. No project activities would occur within other mapped multi-storied stands that could provide habitat for lynx prey species. A habitat improvement project proposed with this alternative would be to construct up to 10 log "jackpots" in these stands. The intent would be to create complex microsites that could be attractive to lynx for use as resting or den sites.

Prey Habitat: Dense Young Forest - Precommercial thinning would not occur within older plantations on NFS lands in the lynx range that are mapped as potentially suitable habitat for snowshoe hares. These areas would slowly grow out of suitable condition as the live tree canopy lifts off the ground.

Unsuitable Habitat - Due to the relatively large percentage of the lynx range that is currently unsuitable habitat, no additional openings would be created in the area through regeneration harvest (e.g., shelterwood). The ability of animals to travel through the mapped lynx range should not be degraded as a result of the project.

Human Caused Disturbance or Mortality - There would be no change to open road densities or designated snowmobile routes on the lynx range. No new motorized or non-motorized trails would be constructed on the lynx range. As would be the case with the not taking any action, the areas within the Tower Fire perimeter available for cross-country snowmobile "play" would slowly contract over time as they become reforested.

Heavy equipment and other vehicle operation, and the presence of humans associated with implementation of the Sx^{w}uytn project could disturb resident lynx or animals dispersing through the area. Activities might occur during the latter part of the denning season (April 1 - July 30). However, any project-related disturbance would be confined in time and space. Activities on the lynx range would occur during daylight hours only and would be localized to a few active harvest units or treatment areas at any given time. Individual lynx or a female with young should be able to displace to more secluded areas if necessary.

Cumulative Effects

The cumulative effects analysis area is the portion of secondary lynx range which overlaps the project area. Known projects, permits, and uses presently underway or proposed on the lynx range are identified in the wildlife resource reports in the project record.

There are no other active or planned vegetation management projects on NFS lands on the lynx range. Most of the state and private lands on the lynx range support young (precommercial) sized trees at this time. The Forest does not expect that future timber sales on state and private lands on the lynx range would be designed to maintain multi-storied stands. Precommercial thinning

could occur within plantations on these lands over the short to mid-term. This treatment normally has the effect of removing potential snowshoe hare habitat.

Activities associated with the Sx^{w}uytn project could be cumulative to disturbances resulting from forest management on other ownerships, or from special use permits, recreation, and other human activities. However, any vegetation management activities on the lynx range would be confined to daylight hours only, would be localized to a few active harvest units or treatment areas at any given time, and would commence during the latter portion of the denning season. Special use permits, recreation, and other human activities would be mostly confined to open road corridors. A lynx that is disturbed by the noise of these activities should be able to displace to more secluded portions of the lynx range.

Grizzly bear

Existing Conditions

Multiple locations of radio-collared grizzly bears have been documented in the Sx^{w}uytn project area in the last 10+ years. Incidental sightings of bears including confirmed tracks have also been documented. Most of these grizzly bear occurrences were associated with the major north-south running ridge along the eastern edge of the project area. This ridge is the western border of a designated Bears Outside Recovery Zone (BORZ) area on the Idaho Panhandle National Forests (IPNF). BORZ areas lie outside recovery zone boundaries and are places where enough bear use has been documented to warrant some level of management consideration (Allen 2011).

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 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. Proposed shelterwood harvest would create approximately 6,830 acres of openings across the project area, over the projected 20-year lifespan of the project.

The Proposed Action Alternative would employ low-intensity fire to reduce forest fuel loads both within and outside of harvest units. Treated areas would either be mostly blackened, or a mosaic of burned and un-burned sites, relative to the amount of surface fuels present (personal comm. with B. Zoodsma 2015). Prescribed fires would thin out dense areas of conifer regeneration and consume litter and down wood on the forest floor. The above-ground portions of bear forage plants could be consumed. However, a "pulse" of nutrients would be released into the soil from the ash of consumed vegetation and dead material. Green 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 be improved for perhaps 5-10 years following burning. It would take perhaps 3-7 years for berry-producing shrubs to re-gain their pre-fire biomass (Coates and Haeussler 1986). Over the longer term, fruit production could be enhanced in burned areas.

Timber harvest and fuels treatments could expose soils and provide opportunities for the expansion of noxious weed infestations. New roads and equipment corridors could provide pathways for the spread of noxious weed seeds. If weeds become locally established due to this project, they could out-compete existing bear forage plants; particularly the native grass and forb species.

Several factors should minimize the potential for noxious weed populations to spread within the project area. Prescribed burns would be completed during optimum weather and fuel moisture conditions in order to ensure low-intensity fire behavior. Thus, most of the forest duff should be maintained and very little soil should be exposed in burned areas. New roads would not be opened to the public. The project would incorporate routine weed control measures such as seeding exposed soils at log landings, skid trails and burn piles. In addition, the Forest Service would continue to use herbicides to combat weed infestations in meadows, power line corridors, and other openings.

Hiding Cover - Hiding cover would be removed over the short term (approximately 5-10 years) within new logging equipment corridors and openings created by timber harvest (e.g., shelterwood). Where the opportunity exists, strips or clumps of trees and shrubs would be maintained along open roads located adjacent to created openings. The intent would be to limit line-of-sight distances from the road into the harvested unit, consistent with Forest Plan Guideline *FW-GDL-WL-01 Hiding Cover for Wildlife*. Within areas proposed for partial harvest (e.g., commercial thinning), hiding cover would be degraded in direct relation to the amount of tree basal area removed.

Prescribed burning should have minor and mostly short-lived (1-3 years) impacts to hiding cover. Within areas proposed for under-burning there would likely be unburned "fire skips" owing to discontinuous fuel concentrations at the stand level. 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 tree boles. Upland shrubs, grasses, and forbs would quickly re-sprout from their root systems and regain much of their above-ground biomass in one to a few growing seasons.

Den Sites – The District does not expect timber harvest and other project activities to affect the suitability of potential den habitat.

Seclusion - Ground-based heavy equipment and other motorized vehicle operation, and the presence of humans associated with the Sx^{w}uytn project could disturb and temporarily displace grizzly bears. Helicopters might be used to log areas that lack roads and where new road construction would be difficult or costly. Some of the more remote timber stands in the Bead Lake and Marshall Lake basins would be potential candidates for aerial logging. The effects of aircraft on grizzly bears may range from "a simple awareness of the aircraft (i.e., raising the head but otherwise continuing uninhibited) to short-term disturbance or flight response (resulting in physiological changes such as increased stress and energetic demands) to temporary displacement from an area" (USDA, USDI 2009). If helicopters are used with the Sx^{w}uytn project, they could have extended effects that are not relaxed (multiple trips each day). However, the risk of adverse effects to grizzlies from project-related disturbances should be slight based on the following:

- Activities would occur during daylight hours only and would be localized to a few active units or treatment areas at any given time.
- Project activities would not occur during the denning period in the vicinity of the best potential den habitat on high elevation ridge systems, due to the cost of maintaining plowed roads.
- Helicopter operations would occur outside the denning and post-denning periods.
- Only a few documented grizzly bear observations are known from the Sx^{w}uytn project area. Bears have not been documented in the Bead Lake or Marshall Lake basins where helicopter logging would be most likely to occur.

With the Proposed Action, the timber sale purchaser(s) would construct new temporary roads and permanent system roads to access timber stands for management. For the duration of the project, motorized travel by the public on these roads would be prohibited with gates or other means. Post-project, these roads would be closed with native materials such as boulders or earthen berms installed on the road entrance, or by ripping the road prism. Any exposed soils would be seeded with grasses and forbs. Finally, shrubs and trees would be planted on the berms or ripped road prisms in order to create a vegetative screen. Based on experience with such native material road closures, the District expects to achieve a high degree of closure effectiveness.

Selected existing roads in the project area would be decommissioned in order to reduce impacts to riparian habitats and water quality in streams. These roads were typically not built in the best location and are not needed for future forest management.

Approximately one mile of motorized trail would be constructed directly adjacent to the Bead Lake Road in order to move snowmobiles off the road and improve public safety during winter months (reduce potential conflict between snow plows and snowmobile use). With the Proposed Action, there would be a net decrease of 6 miles of open motorized routes from the current condition (-7 miles of open roads, + 1 mile of new motorized trail).

Table 21 compares the open road densities and core habitat levels in the project area between the existing condition and Proposed Action alternative.

Table 21. Seclusion habitat indicators and measures for the existing condition

Resource Indicator	Measure	Existing Condition	Proposed Action
motorized access	Open route miles	305 miles	299 miles
	Open route density	2.1 miles / square mile	2.1 miles / square mile
	Drivable (open & restricted (gated)) route miles	572 miles	568 miles
	Drivable route density	4 miles / square mile	4 miles / square mile
core habitat	Acres further than 500 meters from open and restricted roads	11,550 acres	11,580 acres

Further reductions in drivable road miles in the Sx^{w}uytn project area are problematic for the following reasons:

- The Forest Service has jurisdiction over only about 26 percent of the drivable roads in the area.
- The Forest Service must provide reasonable (i.e., road) access to private in-holdings on the forest per the Alaskan National Interest Lands Conservation Act. Many NFS roads in the project area also access private and state lands.
- Open road access is desired by other agencies (e.g., to maintain radio communications equipment on North Baldy Mountain).
- Mainline road access is also needed and desired for fire suppression, recreation, and special use permits.

With the Proposed Action, approximately 19 miles of roads that are presently open to full-sized vehicles (cars and trucks) only, would be opened to all motorized vehicles (including OHVs). This action would create logical loop rides and avoid "dead-ending" OHV enthusiasts. Noise decibels from intermittent OHV traffic on these roads would increase from the present condition. This could potentially reinforce the response of some wildlife species to displace away from the 0.25 mile "open road influence zone." Opening these roads to OHVs could result in an increase in illegal travel onto closed spur roads. For this reason, the Forest Service would monitor closed roads in the project area for five years. The Forest would take any steps necessary to address breaches and improve the effectiveness of existing road closures.

Dependent on available funding, approximately 7 miles of non-motorized trail would be constructed in the Bead Lake Watershed. These proposed trails would likely increase human presence within the lake basin. The nearest known occurrence of grizzly bears to this area was a set of tracks photographed in 2015 on South Baldy Mountain, more than six miles to the north. A biologist would assist with locating the proposed trails in order to avoid local areas that may be important to wildlife such as montane meadows or wetlands.

Cumulative Effects

In grizzly bear recovery zones, biologists evaluate and monitor habitat over individual bear management units (BMUs). A BMU is roughly 100 square miles in size; the average area required to support an adult sow with cubs. The Sxʷuytn Project area is approximately 143 square miles. Thus, the project area is an adequate area over which to assess cumulative effects to grizzly bears.

A list of other recent (within the last 10 years), ongoing, or potential projects, uses, and activities throughout the cumulative effects area is located in the project record. No other timber sales are currently active or planned on NFS lands in the cumulative effects area. Active sales or planned timber harvest on other ownerships are not known.

Cumulative Effects to Hiding Cover - Timber harvest on all ownerships in the cumulative effects area would reduce hiding cover by removing trees and other vegetation. On NFS lands, hiding cover would be retained within openings created along open roads to the extent feasible, as described earlier. Forest succession would restore hiding cover in most harvested areas within 5-10 years. The landscape across the timbered portions of the cumulative effects area would be a mosaic of stands in different structural stages and should remain highly permeable to dispersing bears. Over time, additional forested acres on private lands in the Pend Oreille River Valley

might be converted to livestock and residential uses thus reducing hiding cover permanently on adjacent lands.

Cumulative Effects to Forage - Active or proposed forest management projects on all ownerships would cumulatively improve foraging opportunities for bears by removing conifer cover and stimulating the growth of understory plants. These benefits would be best realized in areas of regeneration harvest (created openings) that are subsequently broadcast burned. However, even partial harvests (e.g., thinning) can improve growing conditions for any green forage and berry-producing shrubs present in the harvested unit.

The Sx^{w}uytn project could contribute to the spread of noxious weeds where soil is exposed by heavy equipment operation. These potential effects could be cumulative to those resulting from timber harvest, livestock grazing, dispersed recreation, and other activities on all land ownerships. To minimize the potential for noxious weed spread, the Forest Service would continue to seed exposed soils, improve the effectiveness of road closures, etc. These actions have been very effective in reducing weed spread in many parts of the forest. Noxious weeds could increase on private and state lands over time, due to varying levels of commitment to prevention, treatment, and monitoring on those ownerships. There would continue to be a potential for weed seeds to be spread from these lands onto NFS lands in the project area.

Cumulative Effects to Seclusion - Grizzly bears using the Sx^{w}uytn Project area could be disturbed and displaced by forest management activities associated with the project. These effects could be cumulative to those resulting from any coincident forest management projects on other ownerships in the area, as well as with ongoing human activities such as recreation. Forest management projects on all ownerships are expected to occur during daytime hours only and would be localized to a few active harvest units or treatment areas at any given time. Bears should be able to displace from these areas to portions of the project area that offer more seclusion. Areas of human activity not connected with forest management would be predominantly confined to residential areas, open road and trail corridors, lakes, and recreation sites such as campgrounds. Bears are already prone to disturbance in these static, high human-use areas.

New roads built with the Sx^{w}uytn project would be kept closed to unauthorized vehicles, and effectively closed following their use. Once the Sx^{w}uytn project is complete, open motorized routes in the project area would have been reduced by approximately 6 miles. Thus, the Sx^{w}uytn project should not contribute to any potential increase in open motorized route density resulting from new road construction on state or private lands. In recent years, private timberland owners in Pend Oreille County have increasingly closed roads accessing their lands with gates or other means. New roads on state lands typically appear to be left open to public use.

3.3.4 Effects Summary: Threatened and Endangered (T&E) Species

Table 22 provides a brief summary of project effects to threatened and endangered species and the rationale for each determination. The expected duration of effects would be as follows: short-term = 0-10 years; mid-term = 10-30 years; long term = 30+ years.

Table 22. Summary of project effects to Threatened and Endangered species

T&E species	Determination	Rationale for determination
Canada lynx	Existing condition May affect, not likely to adversely affect	Plantations with dense, low cover that are presently suitable for snowshoe hares would grow out of suitable condition over the short to mid-term. Hare habitat would be recruited over this time frame over some portion of the Tower Fire burn scar. Multi-storied stands and potential den habitat likely maintained for the foreseeable future. Increasing fuel loads would continue to elevate the risk of large-scale habitat loss to future, high-intensity fires. Animals would likely avoid intensively burned areas, due to the lack of concealing cover. Wildfires could set the stage for the development of snowshoe hare habitat within 10-30 years through natural forest succession.
Canada lynx	Proposed Action May affect, not likely to adversely affect	The last confirmed lynx detection in Pend Oreille County was in 2008 (Lewis 2016). No known lynx den sites on the forest. Due to their relative scarcity on the lynx range, mapped potential den stands and other multi-storied stands would be maintained (not harvested). Due to the current surplus of unsuitable habitat (forest openings) on the lynx range, no additional acres of this habitat would be created through shelterwood harvest. Plantations with dense, low cover that are presently suitable for snowshoe hares would grow out of suitable condition over the short to mid-term. Hare habitat would be recruited over this time frame over some portion of the Tower Fire burn scar. There would be no change in open road miles or designated snowmobile routes on the lynx range. *Cumulative effects*: No other active or planned vegetation management projects on NFS lands on the lynx range. Lynx habitat components on other ownerships are unlikely to be conserved. Young plantations on non-NFS lands would likely be precommercially thinned, removing their potential to be used by snowshoe hares.
Grizzly bear	Existing condition May affect, not likely to adversely affect	Quality green forage for bears would continue to be available in permanent openings such as fields, pastures, wetlands, and meadows over the long term. Green forage would continue to be available within the Tower Fire burn scar over the short to mid-term. Berry-producing shrubs would take some years to fully recover in this area, but productivity could be enhanced. Increasing fuel loads would continue to elevate the risk of large-scale forest cover loss to future, high-intensity fires. Palatable forage plants would be promoted in burned areas.
Grizzly bear	Proposed Action May affect, not likely to adversely affect	The Sxʷuytn project area is outside of the Selkirk Mountains Grizzly Bear Recovery Zone. Grizzly habitat needs are not a necessary consideration on these lands, but maintenance and improvement of habitat is an option. Bears have been documented in the project area, particularly on the ridge system that forms its eastern boundary.

T&E species	Determination	Rationale for determination
		Reduced risk of large-scale forest cover loss to future high-intensity fires through stand stocking control and reduction of fuels. Timber harvest and under-burning would improve the production and palatability of existing green forage plants over the short to mid-term. Berry crops could be enhanced in treated areas over time. Hiding cover would be retained where it exists in openings created along open roads (shelterwood harvest units). New roads would be kept closed to public use. Post-project there would be a net reduction of 6 miles of drivable routes from the current condition. About 20 miles of roads presently open to full-sized vehicles only would be opened to all vehicles (including OHVs) in order to create logical loop routes and avoid "dead ending" OHV riders. The Forest would monitor closed roads in the project area for five years and take steps necessary to address any breaches of road closures by motorized vehicles. *Cumulative effects*: There are no other known active or planned vegetation management projects on NFS lands in the Sxʷuytn project area. Forest management projects on other ownerships should have similar beneficial effects to grizzly bear forage resources. The Sxʷuytn project could contribute to human disturbance in the area that would be cumulative to timber sales on other ownerships, as well as ongoing human uses and activities. However, activities associated with forest management projects on all ownerships would be confined in time (daylight hours) and space (individual treatment areas or groups of areas) Bears should be able to displace to more secluded portions of the project area. Areas of human activity not connected with forest management would be predominantly confined to residential areas, open road and trail corridors, lakes, and recreation sites such as campgrounds. Bears are already prone to disturbance in these static, high human-use areas.
Yellow billed cuckoo	All Alternatives No effect	No known sighting records of this species from Pend Oreille County. Dense stands of willows and cottonwood trees exist within proximity to the Pend Oreille River on the western boundary of the Kalispel Indian Reservation. There would be no impacts to these habitats.

3.4 Botany

The following is a summary of the Sxʷuytn Biological Evaluation – Botany Resources Report (Hendrix 2020).

Methodology

Effects to sensitive plant species are evaluated based on field survey results, occurrences and presence of suitable habitats, and the expected responses of each species to the proposed activities.

3.4.1 Threatened, Endangered, and Proposed Plants

The Sxʷuytn project area is entirely included within the boundaries of Pend Oreille County, Washington. For this county, the USDI Fish and Wildlife Service lists one threatened species, Ute ladies'-tresses (*Spiranthes diluvialis),* one proposed species, whitebark pine (*Pinus albicaulis*), under the Endangered Species Act of 1973 (USFWS 2020, https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=53051).

No federally threatened or endangered plant species are known to occur on the CNF. Field botanical surveys are routinely conducted for projects on the CNF in potentially suitable habitats for Spalding's catchfly, but no occurrences have been documented to date. Whitebark pine, a species proposed for listing as threatened, is documented from the project area, although proposed treatment occurs outside of known occupied habitat. As such, implementation of project activities will result in no effect and will not result in jeopardy to the species.

3.4.2 Sensitive Plants

Sensitive species, as determined by the Regional Forester (USDA FS 2019), are those for which population viability is a concern. This can be indicated by a current or predicted downward trend in population numbers or suitable habitat which would reduce the species' existing distribution. Forty-nine vascular and non-vascular sensitive plant species on the Regional Forester's Special Status Species List (2019) are documented or suspected for the CNF. Of the surveys completed to date in the project area, one Forest Service sensitive plant species, crenulate moonwort (*Botrychium crenulatum),* is known to occur in the Sxʷuytn project area. Occurrences of this species are located within three different proposed treatment units.

3.4.3 Direct, Indirect and Cumulative Effects

Construction activities included with the proposed action (road construction, trail construction) would have direct effects with the generation of new openings and ground disturbance for weed establishment. Indirect effects would be the spread of weeds from these roads acting as vectors for weed populations. As recommended, seeding with native grass seed following construction activities, with post monitoring and weed treatment which is included as a project standard practice would effectively reduce invasive plant spread in the short- and long-term. There should be limited effects to sensitive plants with these actions.

Threatened, Endangered, or Proposed Plants

Because no occurrences for threatened or endangered plants exist in the project area, there would be no effect related to the proposed action. Whitebark pine, a species proposed for listing as threatened, is known to be present in the project area. Proposed activities would occur outside of occupied habitat; therefore, no effect is anticipated for whitebark pine.

Sensitive Plants

Assuming the implementation of the design elements, impacts to sensitive vascular and non-vascular botanical populations or species would be inadvertent and likely be limited. As such, the

activities proposed in this project may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.

When the effects of past, present, and reasonably foreseeable activities are combined with the anticipated effects from the proposed activities, sensitive plants and their habitats may be impacted, but their viability in the planning area is expected to be maintained due to unaffected habitat and occurrences remaining inside the project area and additional occurrences being present on the Forest.

3.5 Recreation

The following is a summary of the Sxʷuytn Recreation Report (Lithgow 2020).

Knowledge of the planning area was developed through multiple days in the field inventorying recreation resources and discussions with the East Zone's Outdoor Recreation Planner. The analysis in this report focuses on the potential effects to the following recreation resources: winter recreation, summer recreation and trail access. The analysis was supported through information contained in the Forest's GIS and INFRA[38] databases, current field data, a volunteer citizen committee and by knowledge obtained through communication with the East Zone's Recreation Planner.

The spatial boundaries for analyzing the effects (direct, indirect, and cumulative) to recreation resources includes all NFS lands within the Sxʷuytn project area This area represents the area of potential impact to recreation resources associated with the Sxʷuytn Project. When considering a broader area (e.g., Forest level), the changes to recreation opportunities become less noticeable as opportunities for dispersed recreation, trail use, and access to inventoried roadless areas become readily available.

The temporal boundaries for analyzing the long-term effects (direct, indirect, and cumulative) to recreation resources are 10-20 years which allows ten years (standard timber sale contract period) to implement all planned vegetation harvest work with an additional ten years to implement prescribed burning activities (which frequently require additional time to meet approved burning windows so resource objectives can be met) and other restoration activities. However, the timeline associated with the immediate effects of harvesting or burning within specific units on recreation resources are generally short-term (less than one year).

3.5.1 Direct and Indirect Effects

Table 23 displays the effects to recreation opportunities by alternative for the Sxʷuytn project.

[38] INFRA is a Forest Service database that tracks NFS infrastructure such as buildings, roads, and recreation facilities.

Table 23. Effects of the proposed action and existing condition by recreation resource element

Resource Element	Resource Indicator	Measure	Existing Condition (rounded to nearest mile)	Proposed Action
Summer Recreation	Designated non-motorized trails	Total miles of NFS non-motorized trails	17	27
Summer Recreation	Designated OHV routes	Total miles of designated OHV routes	58	78*
Trail access	Trail accessibility	Change to trail system improvements	0	5

* This includes designating ~19 miles of NFS roads and ~1 mile of trail for use by OHVs.

Projects included in the proposed action that would provide improvements to the recreation-based access infrastructure are:

- Enlarged parking area at the Bead Lake boat launch
- Enlarged parking area at the Mill Creek snowmobile parking area
- New trailhead at No-Name Lake
- New dock adjacent to Bead Lake boat launch
- New snowmobile route segment along southwest side of Bead Lake (to move OHV use off County Road 30290)

3.5.2 Cumulative Effects

Relevant past, present, and reasonably foreseeable future actions found in the project record were considered. There are no other management projects proposed on NFS or non-NFS lands that overlap in space or time with the Sxʷuytn project that would affect the recreation resource. Therefore, there would be no cumulative effects.

3.5.3 Summary of Environmental Effects

Taking no action would not meet the purpose and need for this project as it would not improve the opportunity for the public to connect to the landscape (EA Chapter 1) nor does it respond to input from recreational users of the area (more information is located in the project record).

Implementing the proposed action would meet the purpose and need for this project (EA Chapter 1) since it responds to input from recreational users of the area and increases opportunities for motorized and non-motorized recreational use as well as improving the quality of recreational use (e.g., provides loop routes for motorized recreational users and provides better access to recreation sites).

The project area would continue to support a variety of recreation opportunities (developed recreation, dispersed recreation, trail, off-highway vehicle use and winter recreation) compatible with the Semi-Primitive Non-Motorized and Roaded Natural recreation opportunity spectrum

classes[39] within the planning area. No long-term change in the character or availability of recreation opportunities within the project area is expected. Short-term disruption in access to and use of developed recreation sites, dispersed recreation activities, trails, OHV activities and winter recreation due to localized harvest/burning activities (including temporary or permanent road closures) may occur. Several standard practices and design elements would be implemented to protect the existing recreation opportunities within the project area and ensure Forest Plan desired conditions, standards, and guidelines relating to recreation are met. Standard practices would also ensure limited exposure of forest visitors to hazardous management activities while improving the area's ability to support a variety of recreation opportunities, particularly typical high-use periods by the recreating public.

The Sxʷuytn project area includes a number of administrative and recreation sites under the CNF LMP. The plan components for relevant management areas would be integrated into the sustainable design of administrative and recreation sites. The Administrative and Recreation Sites Plan would be followed and Plan components are included in the standard practices and design elements that are part of the proposed action. Specific sites identified in the LMP (Appendix G) as administrative or recreation sites are identified in Appendix A.

3.6 Soil

The following is a summary of the Sxʷuytn Soil Resource Report (Jimenez 2020).

Methodology

The project area was evaluated using current soil maps, geology maps, and topographical maps as well as historical and current aerial imagery. The soil scientist and soil crew visited timber stands and wetlands within the project area in summer 2019. The soil crew conducted eight Forest Soil Disturbance Monitoring Protocol surveys in proposed treatment stands. These eight units were targeted at different times post-harvest (10 years to 50 years) to determine sampling priorities during layout using the Monitoring Protocol as well as additional reconnaissance level evaluation by the soil scientist and soil technicians.

During layout and implementation additions surveys would be conducted on all units with mechanical treatment that have an estimated 5% or more existing detrimental soil condition. Additional Monitoring Protocol surveys would be conducted during layout activities to determine site specific soil restoration needs and the need to prescribe any soil design elements in specific units. It is estimated that 50% of planned units would receive quantitative data collection. Other outstanding risks to soil and/or watershed would be evaluated. Field surveys and review of aerial photos would identify the presence of slumps or other landslide features within unit boundaries.

Using Groundwater Dependent Ecosystem Survey Protocol (USDA Forest Service 2012), the Soil Crew surveyed selected mapped wetlands on Forest Service lands within the analysis area.

[39] Recreational settings and natural resource-based recreational activities are managed to meet the recreation opportunity spectrum (ROS) classifications in which they occur as identified on the ROS map in CNF LMP Appendix F.

Wetlands were also surveyed to determine if they meet criteria for hydric plants, hydric soils, and wetland hydrology. A total of 29 wetlands were surveyed in 2019.

3.6.1 Direct and Indirect Effects

Table 24. Soil resource indicators and measures – direct and indirect effects

Resource Element	Resource Indicator	Measure	Proposed Action Direct and Indirect Effects
Soil Function	Detrimental Soil Conditions	Extent in Activity Areas	10% - 2,450 Acres
Soil Erosion	Surface Soil Erosion and Landslide Potential	Potential for Detrimental Surface Soil Erosion and Detrimental Mass Soil Movement	Moderate (short-term 0 to 5 years) Low (long term 5 to 50 years) With Recovery of Soil Cover.
Soil Organic Matter	Depth of Forest Floor, Quantity of Fine and Coarse Wood	Potential for Soil Fertility and Soil Function Issues Due to Lack of Organic Matter Inputs	Low
Watershed Function	Area of Proposed for Disturbance of Hydrologic Function	Acres of Additional System and Temporary Road minus Areas of Hydrologic Function Restoration (Road Decommissioning and Wetland Restoration)	-30 Acres (Overall, 30 acres would improve hydrological or ecological function)
Wetland Function	Status of Function (*properly functioning, functioning at risk, and nonfunctional*)	Number of Surveyed Wetlands in Properly Functioning Condition	23 Wetlands

3.6.2 Cumulative Effects

Table 25. Soil resource indicators and measures – cumulative effects

Resource Element	Resource Indicator	Measure	Proposed Action Cumulative Effects
Soil Function	Detrimental Soil Conditions	Extent in Activity Areas	No Cumulative Effects
Soil Erosion	Surface Soil Erosion and Landslide Potential	Potential for Detrimental Surface Soil Erosion and Detrimental Mass Soil Movement	Low – (No Change)
Soil Organic Matter	Depth of Forest Floor, Quantity of Fine and Coarse Wood	Potential for Soil Fertility and Soil Function Issues Due to Lack of Organic Matter Inputs	Low – (No Change)

Resource Element	Resource Indicator	Measure	Proposed Action Cumulative Effects
Watershed Function	Area of Proposed for Disturbance of Hydrologic Function	Acres of Additional System and Temporary Road minus Areas of Hydrologic Function Restoration (Road Decommissioning)	Not Applicable
Wetland Function	Status of Function (*properly functioning, functioning at risk, and nonfunctional*)	Number of Surveyed Wetlands Rated as Properly Functioning	Not Applicable

There are no other activities in the reasonably foreseeable future that are expected to substantially increase the detrimental soil condition in the project area. There is no overlap in time and space. Effects are described in the direct and indirect effects in the previous sections.

There are no quantifiable cumulative effects as a result of the proposed action in terms of Soil Function, Soil Erosion, Soil Organic Matter, Watershed Function, and Wetland Function resource elements. This is due to the bounding of the analysis on the activity area and the effects categorized as direct and indirect.

3.7 Special Uses and Minerals

The following is a summary of the Lands Special Uses and Minerals report (Lowell 2020).

There are 17 existing lands special use authorizations located within the Sxʷuytn project area (this excludes cost-share road easements). A review of the Bureau of Land Management Legacy 2000 database identified numerous active mining claims within the project area. A list of special use authorizations and mining claims are listed in the project record.

A Plan of Operation is required to be in place prior to occurrence of any ground-disturbing activities. There is currently no approved Plan of Operation for any of the claims.

3.7.1 Direct, Indirect and Cumulative Effects

There would be no impacts (direct, indirect or cumulative) anticipated with regard to improvements authorized under special use permits or easements if the recommended design elements and standard practices are implemented. Effectiveness of the measures in avoiding impacts to improvements is expected to be very high and success (ability to implement the measure) would also be very high.

Contacting special use permit holders in advance of project activities would allow them to identify the locations of their improvements in the field and would be sufficient to have operators avoid their improvements. Directional felling of trees away from structures such as power distribution lines and water lines is a standard safety practice and is expected to be followed by contractors. Fuels treatment is generally designed by the Forest Service and would take into account potential hazards such as power lines.

Before project implementation, timber staff would contact the Forest Service Minerals Administrator to determine where current mining operations are within the project boundary. There is low probability that locatable mining claims would be located in the project area.

There would be no effect to special uses and minerals if the proposed action did not occur. Special use authorizations and mining claims would remain in effect and permit holders and mining claimants would not be contacted as no activities would occur.

3.8 Effects on Consumers, Minority Groups, Women, Civil Rights and Environmental Justice

This section is based on information from the U.S. Census and from IDT member input. No adverse effects to consumers or civil rights were identified through the effects analysis. The proposed action was assessed to determine if it would disproportionately impact minority or low-income residents of Pend Oreille County in accordance with E.O. 12898. Approximately 16 percent of the people in Pend Oreille County have an income that is below the federal poverty level (U.S. Census 2016). Low-income residents use the Colville National Forest for recreation, to gather forest products, hunt, and fish. There is no evidence that low-income people use the project area disproportionately when compared to other people. Further, the proposed action maintains access for these activities. Minority communities or low-income people would not be disproportionately affected.

4.0 Agencies and Persons Consulted

The opportunity for public participation in the analysis of this project was initiated through a series of public workshops (November 7, 2018; March 21, April 18, May 16, June 21 and July 18, 2019; Cusick Washington) and a public field visit (September 25, 2019). The scoping period was initiated January 17, 2020, by letter sent to the public, including adjacent landowners. Federal, State and local agencies, Tribes, and other non-Forest Service persons and interested parties. Public scoping meetings were held in Cusick (January 23, 2020), Colville (January 28, 2020) and Spokane (January 29, 2020). The public was informed that Forest Service and Kalispel Tribe representatives were available to attend other organization's meetings if invited. Representatives from Forest Service and Kalispel Tribe were invited to, and attended, a Selkirk Trailblazer's meeting to answer questions[40] (March 12, 2020; Ione, Washington).

Project information related to workshops and scoping was posted on both the Forest Service and Kalispel Tribe of Indians websites. The Sxʷuytn project was first published in the Colville National Forest's Projects Publication on January 1, 2019.

Additional information related to public involvement is located in the project record.

The Forest Service consulted the following entities during the development of this environmental assessment.

[40] Several Selkirk Trailblazer attendees expressed the opinion that the Colville National Forest should retain every National Forest System road within the Sxʷuytn project (and all areas of the NF), and that it is the tax payers' right to maintain motorized access across publicly managed lands in every case.

4.1 Federal, State and Local Agencies

USDI Fish and Wildlife Service
Washington State Department of Natural Resources
Washington Department of Fish and Wildlife
Pend Oreille County Board of Commissioners

4.2 Tribes

Kalispel Tribe of Indians
Confederated Tribes of the Colville Reservation
Spokane Tribe of Indians

4.3 Others

The Forest Service provided information on this project to over 500 individual entities (identified on the project mailing list located in the project record). This list includes Northeast Washington Forest Coalition, recreation, environmental, industrial, political groups and individuals, and other interested entities.

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