United States Department of Agriculture
Forest Service

Renshaw Vegetation Management Project

Environmental Assessment

Newport-Sullivan Lake Ranger Districts, Colville National Forest, Pend Oreille County, WA

February 2015

Tiger Meadows

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CHAPTER 1 – Purpose and Need

Introduction

The Newport-Sullivan Lake Ranger Districts are conducting this environmental assessment (EA) to analyze options for restoring forest health and reducing hazardous fuels, and to provide data from which the Forest Supervisor can make a decision. Treatment options analyzed include commercial timber harvest, noncommercial vegetation treatments (e.g., precommercial thinning, planting), fuel treatments (e.g., prescribed burning), as well as improvement of ecological processes through restoration of fish habitat improvement projects and other water quality projects.

The Land and Resource Management Plan of the Colville National Forest (hereafter referred to as the Forest Plan) represents the preferred alternative of the Final Environmental Impact Statement (FEIS, approved December, 1988) and, together with the Record of Decision, as amended by the Regional Forester's Forest Plan Amendment #2, the Inland Native Fish Strategy (INFISH), the Region 6 Preventing and Managing Invasive Plants Record of Decision , and the Lynx Conservation Assessment Strategy (LCAS), provides direction for management of the Forest and general discussions of associated environmental impacts. This EA is tiered to the Forest Plan FEIS.

We prepared this environmental assessment (EA) to determine whether implementation of commercial and noncommercial treatments as well as ecological restoration activities may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Proposed Action and Alternatives section of this document (chapter 2)

Proposed Project Location

The project area covers approximately 3percent of the Newport-Sullivan Lake Ranger Districts and less than 1percent of the Colville National Forest. The analysis area is about 13,234 acres of land within the Lost Creek subwatershed. The elevation of the area ranges from about 2,200 feet to about 5,200 feet near Granite Peak. This table displays the legal description of the analysis area.

Table 1. Legal Description of Project Area

Township	Range	All or portions of Sections
T. 36 N.	R. 42 E.	1-3, 11-14, 24
T. 36 N.	R. 43 E.	6-8, 17-19
T. 37 N.	R. 41 E.	13, 24, 25
T. 37 N.	R. 42 E.	13-15, 19, 21-36

Primary access to the analysis area is from County Road 2625 (Hanks Butte), County Road 4699/Forest Road 7018000 (Rocky Creek), and State Highway 20.

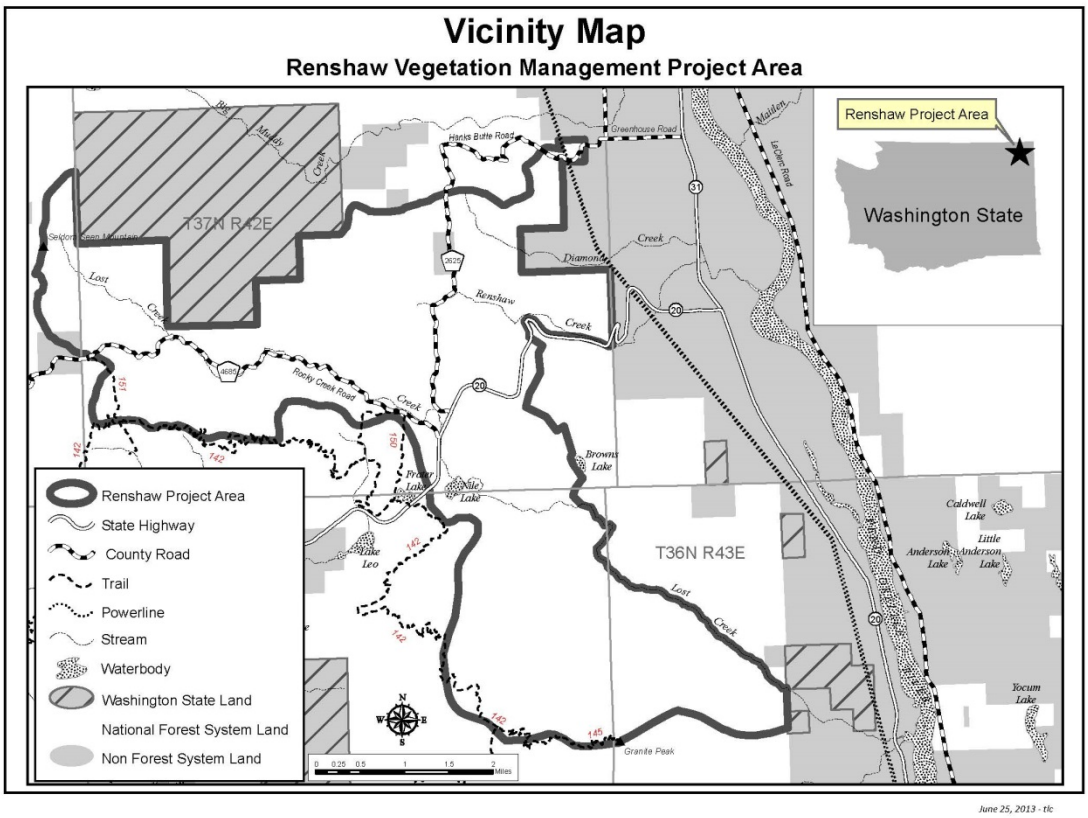

Figure 1. Vicinity Map

Purpose of and Need for the Proposal

The Renshaw proposed action is based on direction found within the Colville National Forest Land and Resource Management Plan (Forest Plan) as amended by both the continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (hereafter referred to as “eastside screens”, Lowe, 1995), and the Inland Native Fish Strategy (hereafter referred to as “INFISH”) as well as direction from the Pend Oreille County Community Wildfire Protection Plan (CWPP) (2005).

Purpose: Meet Forest Plan direction to promote tree growth, reduce insect and disease levels (Forest Plan pages 4-2, 4-18), and move landscape toward historic fire regime conditions. Increase the ability of forested areas (stands) to resist uncharacteristically high levels of loss due to insects, disease, and wildfire by restoring the composition, structure, pattern and ecological processes necessary to make these ecosystems sustainable and resilient (FSM 2020). Take actions, where needed, to meet the above stated purpose.

Needs: Stand treatments are needed to reduce susceptibility to continuing insect and disease-caused mortality over the long-term and promote development of late-successional habitat and old-growth forest ecosystems. Fuels treatments are needed to start the process of reversing the

hazardous and expensive trend toward high-intensity crown fires. There is a need to improve ecological processes through restoration of water quality and fish habitat. There is a need to support local economies and wood processing infrastructure.

Note: The need for this project is derived by comparing current ecological conditions to the desired conditions described in the Goals, Objectives, and Management prescriptions in the Forest Plan, the Regional Forester's Forest Plan Amendment #2, and the INFISH. These are described in the **Management Areas** section below.

Methodology: The condition of forested areas (stands) and woody fuels were determined throughout the analysis area using stand exams, aerial photo interpretation, Forest databases, and field observations.

Observations: It was observed that stands within the Renshaw Analysis area have an overabundance of trees (overstocked), making them less healthy and therefore less able to resist uncharacteristically high levels of loss due to insects, disease, and wildfire. Many stands have also been substantially altered from their historic range of variability by the suppression of wildfires over the past 75+ years resulting in increased ladder fuels and growth of tree species that are less tolerant of fire. This has resulted in a higher probability of increased fire size, frequency, intensity, and severity across the landscape. As the probability of higher intensity wildfire increases, there is also increased risk of detrimental effects to key ecosystem components like watershed function and wildlife habitat. It was observed through Total Maximum Daily Load (TMDL) readings that water quality as well as fish habitat could be impaired due to temperature as well as sediment loading.

Discussion: The 1988 Land and Resource Management Plan, Colville National Forest (USDA Forest Service, 1988), (hereafter referred to as the Forest Plan) directs the promotion of tree growth, creation of wildlife cover, reduction of insect and disease levels, provides for high quality water and aquatic habitats, and development of densities that sustain wood fiber production (Forest Plan pages 4-2, 4-18). For Forest Plan Management Areas 1, 3A, 5, 6, 7, and 8, the Forest Plan directs that insect and disease outbreaks be prevented or suppressed when Management Area values are threatened (Forest Plan pages 4-72, 4-79, 4-96, 4-100, 4-104, 4-108).

Restoring early seral species to their historic level would improve sustainability and resiliency in this ecosystem. Under historic fire regimes, early seral species played a more dominant role in the forested landscape. Many of the largest trees were early seral species like western white pine. Many of these large early seral trees were lost during the homestead era due to large wildfires (1910-1930), as a result of large-scale timber production, and due to other factors such as residual logging slash combined with weather conditions. Restoring early seral species would result in a landscape that is less susceptible to insect and disease outbreaks, better able to withstand effects of fire, and would improve conditions for developing (in time) large and old trees (i.e. late and old structural stage and providing habitat for species that require these type conditions.

Figure 2. Lodgepole pines in the project area, killed by mountain pine beetle

With the exception of areas treated (i.e. timber removal, thinning, prescribed burning) within the last 15 years, the Renshaw analysis area currently includes many acres of forested areas that are highly susceptible to a variety of pathogens. Many of the lodgepole pine stands in the analysis area are reaching conditions where they are most susceptible to mountain pine beetle mortality. Mountain pine beetle, western pine beetle and Douglas-fir beetle are active within the analysis area and are mainly affecting ponderosa pine and Douglas-fir. Dwarf mistletoe is present in the western larch and lodgepole pine. Stand treatments are needed to reduce susceptibility to continuing insect and disease-caused mortality over the longer-term (Brogan 2014).

Wildfires are becoming increasingly expensive; dangerous to firefighters; and threatening to wildlife habitat, beneficial uses of water, and adjoining private land and property. During the past 75 years, fire suppression has resulted in increased ground and ladder fuel conditions, and increased tree-crown continuity in portions of the Renshaw Analysis area. As forest fuels have increased over time, the potential for high intensity crown fires has also increased. The effect of reducing the risk of large, stand-replacing fires would be to: 1) decrease the probability that a wildland fire would develop into, or be sustained as, a stand-replacing or crown fire, 2) increase the ability to provide for public and firefighter safety during a wildland fire, and 3) increase the effectiveness and efficiency of protecting property within the wildland-urban interface. Most of the woody fuels proposed for treatment (i.e. piling and burning, mastication) in the Renshaw analysis area are in Condition Class 2 or in Condition Class 1 and moving toward Condition Class 2 (see Fire/Fuels discussion in chapter 3). It is estimated that should a wildfire occur (in the hottest/driest weather conditions), crown fire and high severity burns would occur on well over three-fourths of the forested acres within the analysis area (based on 97th percentile weather). Reducing fuels in Condition Class 2 stands, and maintenance activities in Condition Class 1 stands, will be the main focus in achieving the primary purpose of providing for a sustainable forest.

The cost of fuel reduction and maintenance burning can be substantial; yet without fuel reduction treatments, fire suppression costs, public resource losses (including wildlife & riparian habitat), private property losses, and environmental damages are expected to be substantially greater over time.

There are areas that do not currently meet standards for fish bearing streams as defined in the Inland Native Fish Strategy due to lack of shade over creeks (canopy), and current road locations within Riparian Habitat Conservation Areas (RHCAs). Reducing sediment input and improving structure and species mix within RCHAs, would improve water quality and fish habitat. Road management would help reduce susceptibility of the aquatic system to large-scale fire effects and improve ecosystem resiliency and sustainability.

There are seven structural stages identified under the Regional Forester's Forest Plan Amendment #2: Revised Standards for Timber Sales on Eastside Forests (Lowe, 1995), also known as the "Eastside Screens." All structural stages are represented in varying proportions in the watershed. Structural stages 1, 2 and 3 are considered an early structural stage of stand development. Structural stages 4 and 5 are considered a middle structural stage. Structural stages 6 and 7 are considered late or old structural stages. Variations in structural stages are a result of fire, insects, diseases, harvest disturbances, weather (precipitation level, wind, etc.), and stand development.

Objective 1: Remove diseased trees, reduce stand density, and modify tree-species composition for the purpose of improving forest health. This would have the effect of 1) improving tree growth to develop more late and old structure, 2) reducing tree and stand susceptibility to damaging insects and diseases, and 3) improving the distribution of stand structures across the forest landscape. (Forest Plan pages 4-2, 4-18)

Measureable criteria: number of acres of silviculturally high-risk stands (e.g., overstocked, at risk for unacceptable levels of insects or disease) treated to move toward structural stage 6 or 7 and/or to reintroduce early seral species.

Objective(s) 2: (Forest Plan pages 4-31, 4-32; CWPP, National Fire Plan)

A. Reduce hazardous fuels (ground fuels, ladder fuels, and forest crown continuity), for the purpose of reducing the risk of large, stand-replacing fires.

B. Start the process of reversing the hazardous and expensive trend toward high-intensity crown fires by reducing fuel levels and stocking, and reintroducing historic disturbance regimes with use of prescribed fire.

C. Increase the ability to provide for public and firefighter safety during a wildland fire and increase the effectiveness of protecting private property within the wildland-urban interface.

Measurable criteria: acres of reduction of crown fire risk based on torching index, crowning index and crown base height (Fire/Fuels specialist report in the project files.)

Objective 3: Address ecological processes through restoration of conditions that currently affect water quality and fish habitat. (INFISH 1995)

Measureable criteria: number of culverts replaced or removed to improve fish passage and/or water quality; and Miles of road (currently within RHCAs) decommissioned or obliterated

Objective 4: Provide forest products which assist in sustaining local economies and options for completing forest management projects. (Forest Plan page 4-2)

Measureable criteria: Availability of projects that can be implemented through timber or stewardship contracts.

Management Area Guidelines

Management 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 4). About 13,117 acres of National Forest System (NFS) land and 117 acres of non-NFS land lie within the planning area. The goal of each MA is briefly described below. No federal actions are proposed on any non-NFS lands.

Table 2. Forest Plan Management Areas

Management Area	Acres	Percent of Planning Area
1	631	5%
3A	853	7%
5	3,353	25%
6	749	6%
7	7,213	55%
8	318	2%

There are six MAs in the planning area. This table shows the percent of NFS land allocated to each management prescription, and maps in appendix A show the locations of these management prescription areas.

MA-1 - Old-growth Habitat – The goal is to provide essential habitat for wildlife species that require old-growth forest components and contribute to the maintenance of diversity of wildlife habitats and plant communities. (Forest Plan page 4-69)

MA-3A – Recreation – The goal is to provide roaded and unroaded recreation opportunities in a natural appearing setting. (Forest Plan page 4-77)

MA-5 - Scenic/Timber – The goal of these areas is to provide a natural appearing foreground, middle, and background along major scenic travel routes, while at the same time providing wood products. (Forest Plan page 4-93)

MA-6 - Scenic/Winter Range – The goal is to provide a natural appearing foreground, middle, and background along major scenic travel routes while providing quality winter range for deer. (Forest Plan page 4-97)

MA-7 - Wood/Forage – The goal is to achieve optimum production of timber products while protecting basic resources. (Forest Plan page 4-101)

MA-8 - Winter Range – The goal is to meet the habitat needs of deer to sustain carrying capacity at 120percent of the 1980 level, while managing timber and other resources consistent with fish and wildlife management objectives. (Forest Plan page 4-105)

Public Involvement and Tribal Consultation

Public Involvement and Collaboration

The Forest Service used multiple methods to determine the major issues that would affect the decision on this project. In summary, the Forest Service involved members of the public, Tribes, interested private groups, and State and Federal agencies by doing the following:

- Publishing a Legal Notice requesting public participation in collaboration in the Newport Miner newspaper on February 27, 2013.
- Listing the project in the Schedule of Proposed Actions, which is published quarterly by the Colville National Forest. This project was first published in April 2013.
- Sending a letter to landowners whose property is within or adjacent to the project analysis area; individuals or groups having special use permits within the project analysis area; and other parties that expressed interest in projects on the Newport-Sullivan Lake Ranger Districts (Forest Service mailing list) (July 16, 2013).
- Requesting consultation with the Kalispel Tribe of Indians, the Spokane Tribe, and the Confederated Tribes of the Colville Reservation (July 15, 2013).
- Meeting with representatives of the Kalispel Tribe of Indians to identify and incorporate issues of concern to the Tribe (January 23, 2013).
- Collaborating with a group of interested parties including the Kalispel Tribe, Pend Oreille County Commissioners, Priest Community Forest Connection, Vaagen Brothers Lumber, Inc., the Northeast Washington Forestry Coalition (NEWFC), Selkirk Trailblazers, and the Colville Drift Riders (at the Newport Ranger District office on January 30, 2013, at the Kalispel Tribe's Camas Wellness Center on March 7, 2013, and at the Newport Ranger District office on March 28, 2014.
- Meeting with Pend Oreille County Public Works Department employees to discuss options for taking on jurisdiction and long-term maintenance of the Rocky Creek Road (C4699) (June 16, June 23, and October 22, 2014).
- Meeting with the public at an open house on September 4, 2014 at the Ione Community Center in Ione, WA

Letters mailed to adjacent landowners and interested parties on the Forest Service mailing list included a map and a description of the proposed action for their review and comment. Background and proposed action information (including maps) were made available during the public meetings. Copies of all comments received from the public and agencies are located in the Renshaw project file at the Sullivan Lake Ranger District office.

The Forest Service also discussed the Renshaw project with the range allotment permittee, the Pend Oreille County Public Utility District (PUD), the Pend Oreille County Public Works Department, local OHV groups, and other interested individuals. Comments received relate to road management (existing and proposed), forest health, stand management, wildlife habitat improvement, fuel treatment, off-highway vehicle trails, riparian habitat condition, and effects analysis. Concerns and comments are addressed in the alternative discussions. The following summarizes the comments that were received.

Summary of Public Comments:

Vegetation Management

- Follow Northeast WA Forestry Coalition (NEWFC) guidelines, specifically with regards to regeneration (including opening sizes);
- Focus timber sale activities in the NEWFC "Active Management Area";
- Support for logging, but would prefer no conflicts with winter harvest activities and recreational use of snowmobiles. Would like any trails that connect to the Beaver Lodge to remain open for snowmobiling;
- There should be a significant statement in the purpose and need regarding the importance of maintaining harvesting and manufacturing infrastructure to utilize material, accomplish the on-the-ground activities, and help pay for the noncommercial activities;
- Support for no commercial activity in the area the public identified as special near Lost Creek;
- Support for treatment of off-site ponderosa pine;
- Treat as many lodgepole pine stands as possible that are in danger due to Mountain Pine Beetle;
- Concern about how stands with past dozer thinning would be treated;
- Treatments planned for this area need to be done with the thought that the Forest Service possibly won’t be returning to those stands in this area for 50 to 60 years. Consider prescribing harvest/fuels treatments that provide long-term effects with appropriate wildlife buffers and forage opportunities;
- Request that proposed commercial treatments adjacent to private property be done effectively to reduce the number of blow downs across private firebreak;
- Support for protecting/enhancing aspen stands.

Fire/Fuels

- Concern about possibility of wildfire on private property;
- Treat as many acres within the wildland urban interface (WUI) as possible. It is important to heavily treat along Hwy 20, Hanks Butte Road and Rocky Creek Road;
- Support for maintaining existing meadows via prescribed fire and/or conifer removal.

Hydrology

- Concern about water quality and temperature impaired streams related to existing conditions and proposed treatments, specifically Lost Creek and other riparian areas within the project boundary;
- Concern about fish passage related to removal or replacement of existing barriers.

Roads

- The closure of the Rocky Creek Road Bridge at 2.5 miles may have negative impacts due to the detour into Steven's County. The detour is determined to be over 30 miles;
- Concern about the forest not sufficiently addressing keeping roads open for elderly and disabled members of the public;

Other

- Concerned about potential timber trespass onto private property;
- Concern about a lack of available firewood.

Key Issues

1. Landscape resiliency

Level of commercial and non-commercial treatment would affect stand structure and composition, thereby affecting resiliency to insects, diseases and fire. Levels of early seral species, structural stages and fire regime condition classes reflect resiliency components across landscapes.

Indicator: acres treated to move stands toward historic seral species and structural stage conditions; and acres treated to move stands toward historic fire regime condition classes (as measured by reduction of crown fire risk based on total acres treated and what the torching index indicates, crowning index and crown base height).

2. Ecological Processes Related to Water Quality and Fish Habitat

Roads crossing perennial streams or located within Riparian Habitat Conservation Areas (RHCA) can impact water quality and fish habitat through increased sediment delivery, reduction of vegetation (stream-side shade), or blockages of fish passage.

Indicator: Number of culverts replaced or removed to improve fish passage, and

Indicator: Miles of road (currently within RHCAs) decommissioned or obliterated.

Decision Framework

The Colville National Forest Supervisor is the Responsible Official for this project. Given the purpose and need and public input, the Responsible Official reviews the alternatives and effects disclosed in chapter 3 in order to decide whether to implement one of the alternatives or portions of an alternative to meet management direction as stated in the Forest Plan.

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CHAPTER 2 - Proposed Action and Alternatives

Two alternatives were developed for the Renshaw project – Alternative A (No Action) and Alternative B (Proposed Action). Issues were identified and then incorporated into the proposed action through collaboration with interested parties as well as other members of the public. The Interdisciplinary (ID) Team and collaborative group determined that a second action alternative would not be necessary. In addition to collaborative input, no issues from other members of the public were received or resulted in a need for additional alternative(s). Therefore, no other alternatives were considered or eliminated from this analysis. This section describes the alternatives that were developed by the ID Team in response to the issues identified. The team then evaluated potential environmental impacts of the various proposals (see chapter 3). All alternatives analyzed in detail are consistent with the Forest Plan as amended, including Regional Forester's Forest Plan Amendment #2 and the Inland Native Fish Strategy Environmental Assessment (EA).

Table 3 on page 33 uses the comparison criteria for each key issue and indicator identified in chapter 1 on page 9 to compare alternatives. A detailed discussion of effects by alternative is contained in chapter 3 and the analysis file. Included in this chapter are design criteria which are accepted practices that have proven effective in avoiding, minimizing, reducing, eliminating, or rectifying the effects of management activities (40 CFR 1508.22). Measures required to mitigate the effects of this project are also presented in this chapter.

Maps of the alternatives are located in Appendix A. A list of acronyms and a glossary is located at the end of the document.

Alternative A (No Action)

The proposed action would not be implemented under this alternative. However, existing, previously approved management activities such as prescribed burning, road maintenance, special use permit administration, cattle grazing, and use of dispersed recreation sites and motorized trails would continue. The Forest Supervisor anticipates that management activities would continue on private lands. A list of reasonably foreseeable activities on other ownerships (obtained from the Washington State Department of Natural Resources Forest Practices Application Review System [FPARS] Database) is in the project files.

The No Action Alternative would continue with a management policy of fire exclusion. Stocking levels and crown fire potential would continue to increase. Under this alternative no fuels treatments would occur and no tree mortality would occur as a result of either mechanical fuel reduction or prescribed fire treatments.

None of the projects listed under the proposed action would be implemented at this time.

Proposed Action Formulation

An Interdisciplinary Team (IDT) identified opportunities for actions in the Renshaw analysis area and presented them to a collaborative group including the Kalispel Tribe, Northeast Washington Forestry Coalition (NEWFC), Priest Community Forest Connection, Pend Oreille County Commissioners, and OHV group representatives at meetings during the spring of 2013. Meeting notes and public comments were considered by the responsible official and IDT and used to develop a draft proposed action. The proposed action was provided for public comment via a

scoping letter. Public comments, follow up collaboration (spring 2014), and specialist input were used to generate the final proposed action.

Alternative B (Proposed Action)

This alternative emphasizes forest health, reduction of hazardous fuels, and improvement of ecological processes through restoration of riparian habitat conditions. Both commercial (e.g., timber sales, stewardship contracts) and noncommercial (including mechanical treatments and prescribed fire) activities are proposed. The interdisciplinary team identified two options for road management with this alternative. Option 1 proposes to relocate the Rocky Creek Road (County Road 4699/FR 7018000) to an upland area outside the stream corridor. This option would reestablish access to the area and improve ecological processes through restoration of riparian habitat conditions (water quality and fish habitat). Option 2 proposes to maintain the Rocky Creek Road in its existing location and repair the deficient bridges that are currently restricting access. The Rocky Creek Road is a primary access route into the project area and would be needed for proposed treatments. Both options would provide access to the project area and were analyzed by the team to determine risks/benefits to both costs and resources.

Forest Health actions[1] would include: (the Silviculture report has individual treatment prescriptions, in the project files)

- Commercial treatment of approximately 4,970 acres using ground-based and potentially some skyline operations. Winter harvest operations may occur 2 years out of a 5-year contract period due to hydrology and soil resource concerns.
- Noncommercial treatments including precommercial thinning (approximately 457 acres) and hazardous fuels treatments outside of commercial treatment areas (approximately 663 acres)

Post Project Treatments: (the Fire and Fuels Report has the unit specific treatments, in the project files)

Commercial Treatments	Acres	NonCommercial Treatments	Acres
Planting	1,926	Precommercial thinning	457
Underburning	1,330	Hazardous Fuels Burning	663
Mechanical Fuels	2,388		

Actions pertaining to roads (in support of forest health actions) under *Option 1* would be:

- Construct approximately 3 miles of National Forest System (NFS) road, and 10 miles of non-system (temporary) road.
- Reconstruct approximately 33 miles of system road.
- Decommission and remove approximately 7 miles of system roads from the Forest transportation system because they are no longer needed for long-term management, to reduce maintenance costs, and reduce system roads.

[1] Definitions for individual treatments are located in the glossary and in the silviculture and fire/fuels specialist reports in the project file.

- Closure of approximately 2.8 miles of NFS roads. The majority of these roads are short, dead-end spurs that are currently un-drivable, but are contributing to total road density as well as illegal motor vehicle use in the project area. These roads would be closed (placed in Maintenance Level 1 status) and put into "storage". Any areas that are likely to impede proper hydrologic function would be stabilized before the road is closed. To aid in public information, the forest service would post a sign at the beginning of the road for one year prior to the closure action.
- Completion of all road-related project activities would result in a net decrease of 4 miles of road removed from the Forest Service transportation system.

Actions pertaining to roads (in support of forest health actions) under *Option 2* would be:

- No new system road construction.
- Construct approximately 10 miles of non-system (temporary) road.
- Reconstruct approximately 33 miles of system road.
- Decommission and remove approximately 4 miles of system roads from the Forest transportation system because they are no longer needed for long-term management, to reduce maintenance costs, and reduce system roads.
- Closure of approximately 2.8 miles of NFS roads. The majority of these roads are short, dead-end spurs that are currently un-drivable, but are contributing to total road density as well as illegal motor vehicle use in the project area. These roads would be closed (placed in Maintenance Level 1 status) and put into "storage". Any areas that are likely to impede proper hydrologic function would be stabilized before the road is closed. To aid in public information, the forest service would post a sign at the beginning of the road for one year prior to the closure action.
- Completion of all road-related project activities would result in a net decrease of 4 miles of road removed from the Forest Service transportation system.

There is one potential new rock material source proposed for development for the Renshaw project. If necessary, four existing rock pits would be utilized for pit run material, within the development limits in the existing development plan.

Approximately 4,970 of 13,234 acres in the analysis area would receive some type of silvicultural treatment to improve stand resilience, stand vigor, and move the stands toward target condition and towards the historical range of variability of structural stages. Highly stocked stands would be treated to reduce the future hazard of insect and disease outbreaks and to modify the expected fire behavior if a wildfire were to occur.

Alternative B would treat approximately 4,381 acres with prescribed fire and mechanical fuel treatments reducing the continuity of fuels and fuel loads, thereby reducing the possibility of a stand-replacing fire and the potential threat of severe fires encroaching on adjacent private property.

Alternative B would support local infrastructure and the economy by implementing projects that include timber sales, stewardship, and/or service contracts.

Description of Proposed Project Design for Alternative B

The following design criteria are accepted practices that have proven effective in avoiding, minimizing, reducing, eliminating, or rectifying the effects of management activities (40 CFR 1508.22). Best management practices (BMPs) are methods, measures, or practices selected by the interdisciplinary team to meet nonpoint-source erosion and sediment control needs. The effects analyses in chapter 3 are based on implementation of these Design Criteria and the Best Management Practices listed in the Hydrology report. The full text of the project-specific BMPs is in the Hydrology specialist report (2014) in the project files unless otherwise noted in the design criteria.

If multiple resource specialists reference a design criterion, the additional resource areas are listed in parentheses at the end of each bulleted statement.

Revegetation

1. In compliance with Management Objective 7 of the Colville National Forest Weed Prevention Guidelines, revegetate where soil is disturbed by project activities. The goal is to provide long-term soil cover and reduce the risk of weed infestation. Locally collected native plant materials are the first choice in revegetation, but non-native, non-invasive plant species may also be used. *(sensitive plants, noxious weeds)*

2. Revegetate disturbed sites and bare soil to prevent erosion. Review areas after burning and seed large bare areas with a high potential for sediment delivery to streams. Applies to all prescribed fire areas. *(soils)*

Fire/Fuels

3. Prescribed fire should be used to maintain meadows from encroachment of conifers, reduce fuel loading and to maintain browse species. These activities would take place within the commercial and non-commercial units, and would be identified by GIS[2] data layers, or silvicultural prescriptions.

4. No underburning of primary rangelands would occur after June 1st or before October 31st with the exception of hand pile burning, which would not negatively affect forage production. The range management specialist would be consulted if burning opportunities arise within this timeframe. *(range management)*

5. Grazing permittees would be notified prior to implementing any prescribed fire within the project area by district fire staff. *(range management)*

6. All burning activities must be closely coordinated with the Survival School within the occupied Muddy training area, with enough lead time to allow survival training to be adjusted if need be (more than one month.) Activities include fire traffic on roads, smoke affecting the Air Forces helicopter, and areas closed due to fire activity. Effectiveness: Moderate *(special uses – Air Force)*

7. Fuels projects involving ladder fuels within heritage site boundaries are allowed with the following provisions: a) no heavy machinery is used within the identified site boundary, b) lop and scatter is allowed within the site boundary for trees and brush less than 6

[2] Geographic Information System is a digital mapping system.

inches in diameter, c) piles made for later burning must be placed outside of all site boundaries. During prescribed fire operations, fire would be kept outside of site boundaries. Additional protective measures would be implemented with regard to flammable historic sites, such as cabins or other structures. Construction of standard fire line around the site boundaries is the preferred method of protection but the pretreatment of structures with foam or water is allowed, as is wrapping structures in heat attenuating materials. The final method of protection of archeological sites is left to the discretion of fire personnel to fit the unique conditions of each location, provided that the protection is adequate to prevent damage to cultural resources. *(heritage resources)*

8. Prescribed fire and jackpot ignition would not occur in the RHCAs (at least 300 feet away from fish-bearing stream channels, 150 feet away from non-fish bearing perennial stream channels and 50 feet from intermittent stream channels). However, low severity fire would be allowed to back in to the RHCAs (including the 25-foot no-harvest buffer) where preparation to keep the fire out of the riparian areas would cause more damage than letting the fire creep in. This is to avoid fire lines that run along the RHCA boundary parallel to stream channels, using foam near stream channels, and running hose lays. These activities are more harmful than letting the fire die out in the RHCA. This would only be used where expected mortality is less than 10percent, loss of large woody debris (greater than 12 inches DBH[3]) would be less than 20percent, and no detrimental impact to the riparian soil would occur. It is expected that there would be mortality of the shrubs and herbaceous plant material. However these species typically regenerate from roots or seeds quickly after low intensity burning. During or prior to burn plan development, the Fuels Specialist would decide whether wood and/or brush in the RHCA needs hand piling in upland vegetation or other treatment or can withstand a creeping ground fire. *(water quality, fisheries)*

9. Fire line construction would not occur within Riparian Habitat Conservation Areas (RHCAs) (default of 300 feet of fish bearing streams, within 150 feet of perennial non-fish bearing streams and wet areas greater than one acre, and 50 feet of intermittent streams and wet areas less than one acre). *(water quality, fisheries)*

10. Locate all refueling sites outside RHCAs unless cleared by the Fisheries Biologist or Hydrologist. In the event of a fuel spill during projects contact the Forest Hazardous Materials Coordinator to coordinate clean up. Fill gas cans outside RHCAs and use absorbent booms and pads to capture any leaks or spills. Hazard materials spill kits would be available for spill containment. The intent is to prevent fuel spills within the RHCA and to generally minimize activities taking place within the RHCAs. *(water quality, fisheries)*

11. Delivery of foam to surface waters would be avoided. An exception could be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a Fish Biologist or Hydrologist, when it is determined an escape fire would cause more long-term damage to fish habitats or water quality than chemical delivery to surface waters. *(water quality, fisheries)*

12. Non-emergency fire response and non-emergency pumping of water and construction of associated small sandbag or gravel berm dams with hand tools would include the following:

[3] DBH = diameter at breast height; usually measured at 4 ½ feet above the ground.

a. The location, pumping rate, and duration of non-emergency water withdrawals shall be designed to minimize aquatic impacts. Non-emergency pumping shall not reduce streamflows to the detriment to fish life. Consult Fisheries Biologist if adequate streamflow levels are in question.

b. Any pump used for withdrawing water from fish bearing water bodies shall be equipped with a fish guard to prevent passage of fish into the pump. The pump intake shall be screened with 3/32 inch or smaller mesh. Screen maintenance shall be adequate to prevent injury or entrapment to juvenile fish and shall remain in place whenever water is withdrawn from water bodies through the pump intake.

c. Temporary gravel berm dams shall be constructed of gravels available on site within the bankfull channel, or of clean, round gravel transported to the site (required to be certified free of noxious weed seeds or plant materials.)

d. No dirt from outside the bankfull channel shall be used to seal the dam and no logs or woody material within the bankfull channel shall be utilized for construction of the temporary dam.

e. Temporary sandbag or gravel berm dams shall be completely dismantled and the streambed restored to its original condition following completion of withdrawal. *(water quality, fisheries)*

13. In units that have had commercial harvest, keep follow up fuel treatment machinery to designated skid trails except for limited passes off designated skid trails. Fuel reduction machinery (i.e., masticators and piling equipment) should be tracked equipment having a ground pressure rating of 8 psi or less and with an articulating arm capable of reaching 15 feet. Minimize compaction, rutting, and erosion by avoiding activities during wet conditions. Ground based equipment would operate on relatively dry soils of high soil strength or bearing capacity. Rutting exceeding soil quality standards should be remediated. The Field Guide to Soil Moisture Conditions Relative to Operability of Logging Equipment (Rust, 2005) should be used to determine soil trafficability. Applies to timber harvest, silviculture, and fuel reduction activities using mechanical equipment. *(soils)*

14. Target machine pile size to no more than15 feet in diameter and 10 feet in height outside of landings. Applies to all fuel reduction and silvicultural activities. *(soils)*

15. Adequately drain firelines including machine and hand line. Waterbars would be installed during fire line construction following guidelines in Fireline Waterbar Guidelines for Prescribed Fires (Jimenez, 2013) and would be described in Elements 5 and 9 of the burn plan(s). Applies to prescribed fire operations. *(soils)*

16. All sensitive plant sites occurring in proposed noncommercial (underburn) treatment units (outside of harvest units, in stands 5110267, 5110531, and 5110693) would be buffered 100 to 150 feet or to the topographic break. Ensure burn plans for units with sensitive plants use control methods that would result in little or no evidence of the burn 100 to 150 feet or to the topographic break from sensitive plant locations. At a minimum, this would include no mechanical fire line, no cutting trees, minimal cutting of limbs and down logs, and no use of retardant. When laying these units out, a botanist would be consulted and the sensitive plant GIS layer reviewed. *(sensitive plants)*

17. Prior to machine piling, mastication, underburning or jackpot burning and reforestation treatments, a review of the post-harvest vegetation and fuel conditions would occur and should involve, at a minimum, specialists from fire and silviculture. This analysis would determine if the anticipated vegetation management treatments are actually needed and if any modifications to the project plans are required. *(silviculture)*

Vegetation Management (Silviculture)

18. Areas of root rot infection would be regenerated to resistant or tolerant species in areas where it is practical to do so.

19. A wildlife biologist, botanist, recreation specialist, landscape architect, fisheries biologist or hydrologist would assist the silviculturist in developing site specific prescriptions, marking guidelines and monitoring if units are located within RHCA's, wildlife habitat, recreation and visual emphasis areas.

20. Reforest areas receiving regeneration harvest within 5 years after harvest.

21. Slash piles containing high amounts of lodgepole pine or ponderosa pine which are at risk to create or continue the spread of bark beetles should be burned or otherwise removed as early as possible in fall. Delaying the slash pile burning for firewood cutting may increase the potential for pine engraver and mountain pine beetle buildup. Firewood cutting or biomass utilization from piles should be allowed as soon as possible after the unit is completed as long as it does not conflict with other resource needs. This would reduce the slash available for the beetles to invade.

22. No old growth stands or structural stage 6 or 7 (late or old) stands are proposed for commercial harvest treatment within the analysis area. If any stands are identified as old growth or structural stage 6 or 7 during future reconnaissance or unit layout, they would be excluded from the harvest activity.

23. Protect all select trees within the project area (units 50, 51, 53, 59, 60, 62 & 66). This includes retaining shelter trees around the select tree to reduce the risk of blowdown. Remove or modify both the ground and ladder fuels adjacent to the select tree to ensure its survival in the event of a wildfire or during site prep burn activities. Select trees are part of the Forest tree improvement program and are designated for cone/seed collection. (map with select tree locations is in the project files)

24. Protect the existing advanced regeneration from logging and post-harvest operational damage to the extent possible in units where some portion of the existing advanced regeneration is prescribed to be managed as part of the future stand. (as identified in unit prescriptions and marking guides)

25. Timing of harvest activities should be considered in intermediate silvicultural treatments when there is a high risk of bark slippage and damage to the residual trees. Bark slippage is the highest in spring and early summer when the cambium is active. Monitoring by sale administrators for excessive harvest damage during logging operations may allow for harvesting during the bark slippage period. Cambium damage in the residual trees can introduce disease organisms through the wound and further stress the trees increasing their risk to insect attacks.

26. The removal of biomass, at least the green sub-merchantable tree portion, should not occur in areas where the advanced regeneration would be managed for the future stand until it is known if there is an excess of trees which could be removed. In the overstory removal areas this would be determined after a pre-commercial thinning/damaged tree removal treatment has occurred.

27. Hardwoods generally would not be designated for removal. Some individual trees may need to be removed in skid trail/yarding corridors. There may be a need to cut some aspen either commercially or non-commercially to achieve aspen regeneration objectives. This need would be addressed in site-specific unit prescriptions.

28. All sensitive plant sites occurring in proposed commercial harvest treatment units (applies to units 26, 27, 60, 66, and 62) or within 100 feet of a commercial harvest unit (applies to units 29, 33, 96, 85, 51, and 39) would be buffered 100 to 150 feet or to the topographic break. When laying these units out, a botanist would be consulted and the sensitive plant GIS layer reviewed. *(sensitive plants)*

Mechanical Operations

29. Skid trail spacing must be specified in the timber sale/stewardship contract as follows. Applies to timber harvest and fuel reduction activities

    a. Skid Trail Spacing: minimum of 100 feet apart edge to edge, except when converging at landings or avoiding obstacles.

    b. Forwarder Trails: minimum of 40 feet apart edge to edge except when converging at landings or avoiding obstacles. Four to eight inches of uncompacted slash should cover forwarder trails. *(soils)*

30. Skidding equipment must travel on designated trails. When feasible re-use old skid trails. Feller-bunchers should concentrate use on skid trails and should travel in an efficient manner with limited passes off skid trails. Applies to timber harvest and fuel reduction activities *(soils)*

31. Slope limitations for ground based equipment as follows. Applies to timber harvest and fuel reduction activities using mechanical equipment.

    a. Tractor and skidder yarding would be limited to slopes less than 35percent. Short slope lengths may be steeper.

    b. Feller bunchers, harvester-forwarder systems, and other tracked heavy equipment would be limited to slopes less than 40 percent. Short slope lengths may be steeper. *(soils)*

32. Winter logging requires that skid trails are buffered by at least 8 inches of compacted snow or frozen ground or a combination of the two that exceeds 8 inches. If cut to length equipment is to be used, a combination of slash, compacted snow, and/or frozen ground that exceed 8 inches can be used to buffer forwarder trails. Applies to timber harvest and fuel reduction activities using mechanical equipment. *(soils)*

33. Decompact landings to restore hydrologic function. Restore soil cover by scarification and seeding or mulching where mechanical treatments removed soil cover. Applies to all timber harvest activities. *(soils)*

34. Retain fine and course organic matter on top of the soil. Soil cover should exceed 35 percent, preferably 50 percent. Maintain soil cover amounts to prevent soil erosion. Treatment units should be maintained with between 6 to 20 tons per acre of course woody material (defined as woody material greater than 3 inches in diameter). Applies to all timber harvest, fuel reduction, and silvicultural activities. *(soils)*

35. For ground based unit 42 practices include:

    - Conduct timber harvest when soil is covered by 8 inches of compacted snow or 8 inches of frozen soil or a combination of two that totals 8 inches. This condition should be present on approximately 90 percent of the timber harvest unit or

    - Conduct timber harvest using cut to length logging systems where stand density supports covering forwarder trails with 8 inches of uncompacted slash or

    - Conduct timber harvest during summer dry conditions. The soil is dry enough for heavy equipment if the soil consistency is loose, friable, or firm, and shows no evidence of plasticity. The soil scientist can advise on site-specific conditions.

    - Reuse any existing skid trails, landings, and road templates.

    - Landings and temporary roads should be decompacted. The first 500 feet of main skid trails should be decompacted on non-winter harvest units. *(soils)*

36. Coordinate all harvesting, logging truck traffic and precommercial activities with the Survival School, with enough lead time to allow survival training to be adjusted if need be (more than 6 months). Effectiveness: High *(special uses – Air Force)*

Roads

37. Existing closed Forest Service system roads opened for the project would be closed as soon as project activities are complete. This applies to any roads that lead to units containing cultural resources. Screening vegetation should be left in place to obscure historic sites from the road whenever possible *(heritage resources*); and to minimize the probability of noxious weed infestation. *(noxious weeds)*

38. All Maintenance Level 1 roads to be used for the project shall be brought up to a Maintenance Level 2 standard and returned to a Maintenance Level 1 after commercial haul on the road is completed with the exception of FR 7018285, which would be left open to firewood gathering for 1-2 seasons following completion of the project. *(transportation)*

39. Option of relocating the Rocky Creek Road (Option 1- assumes Rocky Creek Road would fall under jurisdiction of the Forest Service before the project): The proposed Rocky Creek Road shall be designed with the appropriate level of service to facilitate the navigation of a lowboy as the critical vehicle with proper width, turnouts, surfacing, etc. and shall include appropriate safety features for a public route designated for all vehicles to use. The proposed Rocky Creek Road shall be constructed prior to implementation of the Renshaw project timber harvest activities. *(transportation)*

40. Option of not relocating the Rocky Creek Road (Option 2 - assumes Rocky Creek Road would fall under jurisdiction of the Forest Service before the project): prior to

commercial haul, all bridges that would be used for the Renshaw Project on the Rocky Creek road shall be inspected, and upon inspection, any deficiencies shall be corrected by repair or replacement of the bridge. Prior to haul on bridges, appropriate overload permits must be submitted and approved. *(transportation)*

41. All sensitive plant sites occurring within 100 feet of road decommissioning (route numbers: 1395010450, 3453010450, and 894010450) would be flagged and avoided. *(sensitive plants)*

42. Temporary Roads and skid trails would be returned to forest productivity no later than completion of the project contract. Temporary roads would be fully obliterated[4] and contoured with decompaction to mineral soils (minimum 18") to facilitate out slope drainage, all stream-crossing structures removed, and be rendered hydrologically stable (per district hydrologist). Temporary Road obliteration would include incorporating slash and forest litter. The desired outcome is to reconnect groundwater hydrology and re-establish forest productivity per applicable BMPs. *(water quality, fisheries)*

43. Closing of system roads following treatment and road decommissioning would not be implemented until weeds have been treated. Temporary roads may be closed as soon as work is completed regardless if area has been inspected for noxious weeds since the greatest threat of noxious weed infestation is vehicular access. *(noxious weeds)*

44. Consult district Hydrologist prior to design and installation of stream crossing on temporary road T24. *(water quality)*

45. Maintenance Level 1 (closed) roads within the project area used for project activities that are designated for closure in which use from vehicular traffic would not occur post project, would have all culverts removed by close of sale contract. At stream crossings, channel would be returned to a condition mimicking pre-disturbance. At cross drains, water bar features would replace the pulled culvert. Other hydrologic drainage features would be restored to a condition to allow shallow groundwater flow and reduce overland flow where it is not a natural condition. The purpose would be to discourage unnatural surface water connectivity and erosion (diminish ponding on the surface and flow down the road into stream channels), reduce road failure risk due to lack of maintenance, and restore hillslope hydrology. *(water quality)*

Heritage Resources

The intent of these design criteria is to protect cultural resources and to comply with the National Historic Preservation Act.

46. Avoid all historic properties during implementation. A minimum 20-meter buffer is required on all sites as established by a certified archeologist. All equipment must stay out of identified site boundaries. Trees would be felled away from the interior site boundaries. The Forest Archeologist or authorized Heritage Program personnel will provide location information (maps and coordinates) to appropriate designated presale and fuels personnel.

47. The inadvertent discovery of historic properties during implementation requires operations to cease within the vicinity of the site. Implementation personnel would notify

[4] See Glossary for definition.

the Forest Archaeologist of the discovery. The Forest Archaeologist or authorized Heritage Program personnel would investigate, record, and provide mitigation measures for the protection of the site. Work cannot proceed until Heritage Program clearance.

48. Special consideration for site protection would be taken if a site is visible from an open system road. If the site or portion of a site is visible from an open system road, then screening vegetation shall be left to conceal the site from view.

Three Zone Strategy for Treatments in the RHCA

49. The Fisheries Biologist, Hydrologist, and Soil Scientist developed a "Three Zone Aquatic Strategy" to be considered on a project-by-project basis. The Strategy provides information to other team members about areas within the Riparian Habitat Conservation Area (per INFISH guidelines) that could be treated and to what degree.

    The Fish Biologist, Hydrologist, and Soil Scientist developed the following Design Criteria as described by their location in the RHCA. These apply to all commercial and noncommercial treatment units.

    - *Zone 1 - Immediately around a stream, wetland, or other water body*
        - Apply a 25-foot no-harvest buffer in either side of the streams and their associated wetlands, or creek and a 50-foot no-harvest buffer on wetlands, lakes, and ponds greater than 1 acre for big game and landbirds.
        - Consultation with the Fish Biologist, and, or Hydrologist would be required when using old road templates located in this zone with the intent that the templates be obliterated after the sale.
    - *Zone 2- Around Zone 1, as applies, the extent of the riparian vegetation or wet soils, whichever is greater.*
        - No mechanical treatment of vegetation would occur.
        - Fuels reduction may include hand treatment of vegetation, but no pile burning of vegetation would occur.
        - Consultation with the Fish Biologist, and, or Hydrologist would be required when using old road templates located in this zone with the intent that the templates be obliterated after the sale.
    - *Zone 3a - Adjacent to Zone 2, the remainder of the RHCA containing upland vegetation where a road occurs within Zone 3.*
        - **Upslope of Roads:** Allow unit treatment as prescribed unless some other issue takes precedent (sensitive soils, shade issues, headwaters, TMDL[5], sensitive plants etc.) that resulted in a unit specific Design Element.
            a. Consultation with the Fish Biologist, and, or Hydrologist would be recommended when using old road templates located in this zone

[5] See Glossary for definition

with the intent that the templates be obliterated after the sale where possible.

- **Downslope of Road:** Follow unit specific design criteria.

  a. Machinery would need to stay back 50 feet from the slope break or inner gorge. Applies to all commercial and noncommercial treatment units.

  b. Treatment of fuels along streams and wetlands where roads are being protected would increase cattle access to RHCAs. To mitigate this, windrows would be created between the RHCA and the treatment, or a fence would be installed to keep cattle out of RHCAs. Applies to all commercial and noncommercial treatment units.

  c. Consultation with the Fish Biologist, and, or Hydrologist would be required when using old road templates located in this zone with the intent that the templates be obliterated after the sale.

  d. If there are no outstanding unit specific issues the following applies:

     I. Slope is relatively flat (less than 20 percent in any direction), and the area is beyond 50 feet of the inner gorge, canopy removal would be less than 25 percent. Harvest allowable with consultation with the Fisheries Biologist, Hydrologist, or Soils Scientist. Preferred treatment is cable winching from road. To prevent creating a fuel problem, log with tops attached if possible.

     II. If the slope is greater than 20 percent in any direction, no commercial harvest would occur. Apply treatments as per Zone 2 (pg. 20 of this EA).

➢ *Zone 3b - Adjacent to Zone 2, the remainder of the RHCA containing upland vegetation where no roads occur within Zone 3.*

- Follow unit specific design criteria. Machinery would need to stay back 50 feet from the slope break or inner gorge. Applies to all commercial and noncommercial treatment units.

- Consultation with the Fish Biologist, and, or Hydrologist would be required when using old road templates located in this zone with the intent that the templates be obliterated after the sale.

- If there are no other concerns identified, single passes of harvest machinery are allowed under the following conditions:

  a. Harvest under winter conditions or over a slash mat (to reduce bare soil)

  b. Slope towards stream is less than 20 percent

  c. Soil is not erosion sensitive.

d. Grapple piling or leave tops attached would be allowed with consultation with the fisheries biologist, hydrologist, or soils scientist.

Restoration Activities

50. Replace, install or remove stream crossing structures at locations identified (see maps in appendix A for locations). Other culverts located on non-system (i.e. user created, abandoned, etc.) roads used during project implementation would be evaluated for replacement or removal by District Hydrologist and/or District Fish Biologist. Recommendation would be provided upon completion of evaluation by the respective specialist(s).

Water Quality/Fish Habitat

Wetland & riparian protection will follow direction of INFISH or as defined for specific units by the district fish biologist, forest soils scientist, and/or district hydrologist.

51. Locate landings, staging areas, and other centers for activities outside of the RHCA. If the only suitable location for such activities is within the RHCA, an exemption could be granted following a review and recommendation by a Fish Biologist or Hydrologist. The Fish Biologist or Hydrologist would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish and water quality being primary goals. The intent is to minimize the effects of management activities on soils, water quality, and riparian resources. Applies to all commercial and noncommercial treatment units.

52. When removing hazardous trees within the RHCA, retain the tree on site and drop it perpendicular to the stream where feasible. The intent is to protect the stream channel and enhance the large woody debris within the stream channels and RHCA. This applies to all hazardous tree removal within the RHCA.

53. During project activities, do not create (by removing or killing trees) openings larger than ¼ acre or openings large enough for camping or parking in RHCAs. This includes keeping fire intensity low to reduce the potential of killing large patches of trees because firewood gatherers often remove the dead trees and leave openings. Landings may be constructed in zone 3 (pgs. 20-21 of this EA) upslope of a road in the upland forest with review by the fish biologist or hydrologist. Since harvest may also occur in the upland vegetation, there would be harvest in RHCAs. Applies to RHCAs only.

54. Wood and/or brush in the Riparian Habitat Conservation Area (RHCA) would be hand piled where more than a low creeping ground fire is expected due to high fuel loading. Piles would be outside of Zone 2 and the 25 foot no treatment buffer. Piles would be burned during late fall through early spring while fuel moisture levels are high enough to limit fire spread. Raking around large trees and shade tolerant species to prevent mortality is recommended. A minimum of 90 percent organic material (duff) would remain on the ground in the RHCA(s) after pile burning in order to protect soil and minimize sediment delivery to streams. Wood would not be removed from the stream channel. At least 35 feet of all existing downed trees of 12 inches or greater in diameter within or overhanging the stream channel (bankfull width) would be left in place (not piled or moved) to meet INFISH Large Woody Debris requirements. Where possible, trees that need to be felled within the RHCA(s) would be felled toward the stream. Where

trees, to be felled, are leaning toward the stream, leave at least 35 foot of each tree that falls across the stream's bankfull width. Applies to all commercial and noncommercial treatments.

55. Wetlands, springs, seeps and streams not previously identified during the inventory and analysis would be delineated during unit layout with assistance from the hydrologist, fish biologist or soil scientist when needed. The intent is to minimize effects of management activities on wet areas, and get an accurate database of the water systems in the area. This applies to all wetlands, springs, seeps and streams.

56. Harvest in RHCAs would protect all tree and large shrub hardwoods and favor western hemlock, Engelmann spruce, and western red cedar where present. Limit the removal of dominant and co-dominant conifers in the overstory canopy on the south side of streams. All units incorporating management activities within the RHCA should be reviewed by the Hydrologist or Fish Biologist during presale activities. Desired outcome is to protect the stream channel, move the stand toward desired conditions to enhance the large woody debris within the stream channels and RHCA and prevent increases in water temperature by retaining shade. Applicable to hardwoods and western hemlock, western red cedar, and Engelmann spruce.

57. Headwaters units would have a minimum 50-foot no vegetation treatment (harvest or ladder fuel reduction) buffer on all perennial and ephemeral streams. Fire can creep into the buffers, but only with low intensity. A Hydrologist or their designee would help the layout crew discern headwater areas in these units (any unit that contains a stream or is adjacent to a stream.)

58. To prevent a negative impact to trout and water quality from the dust created from the haul trucks, dust abatement in the form of water would be used at the discretion of the Sale Administrator. Nile Lake is the preferred source for filling water tanks. If the use of chemicals is requested, then a hydrologist or fisheries biologist would be consulted. This would apply to all system and temporary roads.

Noxious Weeds

The intent of these design criteria is to reduce the risk of noxious weed establishment and provide for long-term soil cover.

59. Noxious weeds that occur within the project area and on existing Forest Service routes used to access the project area would be treated prior to any harvest or ground disturbing activities[6].

60. Contract provisions would provide for cleaning of equipment.

61. Noxious weed prevention would be conducted as prescribed in the *Colville National Forest Weed Prevention Guidelines* (USDA 1999). This document sets forth the practices to be followed to minimize the introduction of noxious weeds and minimize conditions that favor the establishment and spread of noxious weeds.

[6] See Invasive Plant Program Preventing and Managing Invasive Plants Record of Decision (2005) for a list of herbicides approved for use - http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5302164.pdf

Range Management

The intent of these design criteria is to minimize impacts to livestock management and the range resource, and to protect existing range infrastructure in the project area.

62. Existing, known range improvement projects would be protected from damage which may result from harvest and burning activities. Known range improvement projects are located in the following units: 1, 38, 51, 102, 128, 129, 131, 133, 134, 136, 148, 149, 163, 191, 203, 244, 290, and 291. Should these range improvement projects become damaged as a result of the proposed action, contract provisions would provide for their repair.

63. All rangeland improvement projects, such as developed springs, water troughs and fences not previously identified by the NEPA inventory and analysis would be delineated and protected during harvest and burning activities as well as notification of the district range management specialist. Should range improvement projects become damaged as a result of the proposed action, contract provisions would provide for their repair.

64. If natural barriers to livestock are breached by the proposed action, fencing would need to be constructed to limit livestock dispersal. There is a potential need for approximately 4.5 miles of fencing in the analysis area near units 5, 7, 38, 59, 67, 89, 102, 108, 119, 122, 129, 131, 136, 141, 163, 177, 178, 180, 191, 203, 224, 231, 286, 287, and 338 if natural barriers are removed. The Rangeland Management Specialist would be responsible for conducting follow up visits to areas listed above to determine the need for barriers. These visits would be conducted for the first and second years following treatment. Where barriers are installed, the rangeland management specialist is responsible for checking the improvement within one year after its completion to ensure the effectiveness of the barrier.

Recreation

The intent of the following design criteria is to minimize disruption of the existing recreation use patterns within the project area, especially those associated with existing winter recreation opportunities, and limit the impacts of unauthorized off-highway vehicle use after the project is implemented. For this project area, there is year-round recreation use that needs to be considered. Significant dispersed campsites are popular, high-use campsites as defined by recreation specialists. Designation of these sites as significant could change yearly based on use patterns determined by recreation staff. A map with locations of significant dispersed campsites and designated motorized and nonmotorized trails is located in appendix A.

65. No hauling of timber, or moving equipment would occur on the following holiday weekends: Memorial Day, Fourth of July (considered to be a minimum of July 3-5), and Labor Day. During winter months this would include the following federal holidays: Christmas, New Years, Martin Luther King Jr., and President's Day. Weekends are defined as Friday at 6 pm through Sunday at 6 pm, or Monday at 6 pm depending on which day the holiday falls. This applies to all treatment types. Any change from this restriction could be approved on a case by case basis by the district ranger. The intent is to avoid conflicts between industrial and recreation vehicle traffic on known weekends of high recreation use.

66. Significant dispersed campsites have been identified by the district recreation specialists and mapped using GPS coordinates (see map in appendix A). A vegetative buffer of approximately 100-150 feet or one and a half tree lengths (whichever is greater) must be left around all significant dispersed campsites. An adequate vegetative buffer would be

coordinated through field visits prior to project implementation with recreation staff and sale administer. Any exceptions must be reviewed on a case-by-case basis by the district recreation officer or designated recreation staff, silviculturist and presale forester prior to project implementation. Marking cut trees is preferred near significant dispersed campsites to avoid visible marking (paint) of tree within the immediate foreground. The intent is to provide screening between campsites, retain the scenic values of the site, provide screening between campsites and the road, and discourage motorized vehicles from encroaching into the surrounding forest or expanding the campsite. In addition, this would help reduce future hazard trees by preventing damage (from harvest equipment/activities) of trees within felling distance of the site. It would also reduce wind throw exposure of trees within felling distance of the site. *(scenery)*

67. Significant dispersed campsites proposed to be used as landings or equipment staging areas must be cleared by a district Recreation Officer or Specialist prior to use. Trees within the no-harvest buffer zone should not be removed or damaged with the exception of the removal of identified hazard trees. These sites would need to be returned to pre-harvest conditions. This applies to all significant dispersed campsites used as landings. The intent is to ensure significant dispersed campsites remain available to recreationists throughout the life of the project; or, if a site must be used, that it is not degraded through loss of vegetation or expansion beyond the current condition.

68. Trails 142, 145, 150, 150.1, 150.2, and 151 passing through treatment units would need to be closed during project implementation. Project created hazards (i.e. partially burnt snags, damaged trees) within one-and-a-half tree lengths of a system trail would be felled immediately. Trails should not be used for hauling or skidding materials except for the portion of the cross-country ski trail #150.1 on the existing road bed and the northern half of ATV trail #151. Damage caused by felling, burning, or skidding operations would be corrected after completion of a unit and the trails returned to pre-harvest conditions.

69. Minimize post-harvest slash accumulation within significant dispersed campsites. After harvest and fuel treatments are complete, rehabilitation would be required in any affected significant dispersed campsites located within the harvest units. Rehabilitation of the site includes: restoring the access route to the general pre-project conditions, restoring the fire ring, and removing slash from the core (the core consists of the heavily used areas including the fire ring, parking area, and tent area) of the campsite. Areas severely compacted and denuded from harvest operations would need to be scarified and seeded. Only those access routes leading to an existing significant dispersed campsites within 300 feet of an open road (per CNF Motor Vehicle Use Map) would require rehabilitation. Routes greater than 300 feet from open roads would need to be closed. This applies to all units where significant dispersed campsites are present. The intent is to provide the public with quality dispersed camping opportunities and to not burden the reduced recreation workforce with the need to clean-up campsites after treatment activities are complete.

70. If a timber sale operator or other contractor wants to camp on the forest during project implementation, they must follow all forest camping regulations and guidelines regarding length of stay, food storage, trash removal, and other regulations and guidelines. If their stay exceeds 14 days, or temporary buildings/trailers (other than typical camp trailers) are used, or other commercial activities occur at the site, then a district recreation officer must be consulted and the campsite approved by a Forest Service official prior to selection. A camping permit and/or timber sale agreement would spell out the conditions

for the commercial use of a campsite. Use of the campsite would be for camping purposes only. No servicing or parking of equipment would be allowed at the campsite. The campsite(s) would need to be returned to the previous condition prior to occupancy. This applies to all treatment types. The intent is to provide the public with the best possible dispersed camping setting and campsites. This would prevent resource and visuals damage at campsites that can be caused by long-term camps.

71. Trail #142, trail #150, trail #151, Rocky Creek road, proposed Rocky Creek relocation, and forest roads 7018550 & 3140456 would require a 50 foot vegetative buffer from the outside edge of these routes and only applies where the trail passes through commercial thinning units (HTH). An adequate vegetative buffer would be coordinated through field visits prior to project implementation with recreation staff and sale administer. Any exceptions must be reviewed on a case-by-case basis by the district recreation officer or designated recreation staff, silviculturist and presale forester prior to project implementation. If an exemption is approved, mitigation may be required including, but not limited to, installing fence, rocks, or other barriers. In cases where clearings are needed for skyline corridors or construction of skid trails, or where other factors already prevent off-road travel such as cliffs and ravines, the vegetative buffer may not be required. This would provide a vegetative barrier to help prevent OHVs from leaving designated routes in HTH units, where wildlife screens are not required. This would also help maintain the visual qualities along these routes.

72. There would be no tree marking paint or flagging within approximately 150 feet of the designated Frater Lake trail system (includes cross country ski trails 150, 150.1, and trails 150, 150.1, and 150.2) visible post-harvest. If flagging and markings are visible post-harvest they would need to be removed or covered. This applies to all commercial and noncommercial units. The intent is to preserve the visual qualities of the trails and OHV routes.

73. Requests to use groomed snowmobile routes for project activities would be coordinated with the district ranger and recreation staff well in advance to allow for coordination with our partners and state and local partners to reduce impacts to winter recreation. Press releases, signing, traffic control measures, and other mitigation measures would be required prior to use of these routes. The intent is to prevent conflicts with winter recreationists, and soil and hydrological issues.

74. All snowmobile trailheads and parking areas within the project boundary need to remain open to the public and should not be used for landings or staging areas or blocked in any manner. Any exceptions would need to be reviewed by the district recreation officer and approved by the district ranger. The intent is to avoid conflicts with winter recreation use and provide access to the groomed trail system.

75. Any stumps within 15 feet of the edge of designated cross-country ski routes need to be left no higher than 6 inches above the soil, regardless of whether the unit is winter logged or not.

76. The proposed relocation of the Rocky Creek Road (County Road 4699/ FS 7018000) and connected roads would need to include relocating winter over-snow vehicle (OSV) and summer OHV use. Input from forest Recreation specialist and grooming partners (under a Forest Service agreement or MOU) would be sought during the design phase to ensure the new route accommodates winter grooming equipment. All applicable recreation

design criteria listed in this document would apply to the proposed route as well as the existing route until decommissioned. The intent is to ensure the designated routes and current uses remain open to the public.

Scenery

77. Immediate Foreground and Foreground Screening: In the selection harvest areas which have portions located in the immediate foreground of Frater Lake, Nile Lake, State Highway20, and County Road 4699, retain screening vegetation (usually conifer regeneration and/or understory hardwoods) in irregular patterns. Meander cut edges where feasible with other resource constraints and feather or filter thin trees at the cut edges to allow "visual penetration" of the "dark forest." This would preserve the naturally occurring landscape and vegetation patterns, thus meeting retention/partial retention visual quality objectives. Minimize and/or adjust alignment of skid trails or temporary roads that create linear openings ("pencil line") perpendicular to the normal line of sight. Where possible, retain cottonwood and aspen trees for diversity of pattern and color and during fire events, as a natural heat sink. Place slash and/or burn piles behind foreground screening vegetation.

78. Seasonal Color (Aspen & Larch): In the immediate foreground and middleground viewing distance zones, the larch and aspen trees are valued for providing dramatic fall displays of color. Where possible, aspen retention either through leaving healthy stands or rejuvenating (as best prescribed by other specialists) decadent or declining stands is recommended and would be a positive effect.

Soils

79. The total acreage of all detrimental soil conditions should not exceed 20 percent of the total acreage within the activity area including landings and system roads. Applies to all management activities: timber harvest, fuel reduction, and prescribed fire.

Special Uses

Existing special use permits and locations are listed in the specialist report for special uses in the project files. All authorized improvements (access roads, power transmission lines, buried telephone lines) would be protected through avoidance.

80. Protect all authorized improvements (access roads, power transmission lines, buried telephone lines) through avoidance.

81. Trees are to be felled away from improvements. Fuels treatment proposed within the area should be planned and implemented to avoid impacts of fire or smoke on BPA[7] power transmission lines.

82. Road maintenance work associated with timber haul roads should be done in such a way as to avoid impacting buried telephone and/or power lines.

83. Prior to project implementation, it is recommended the project leader contact the Forest Minerals Administrator to determine whether new mining claims have been located in the project area.

[7] Bonneville Power Administration

Air Force

84. Leave, as much as possible, pockets of more heavily stocked areas within the Air Force Survival School's core area (Muddy Training Area) to provide material for the Survival School.

Threatened, Endangered, and Sensitive Species (TES) and Management Indicator Species (MIS)

Target species	Design element	Management framework	Project design criteria
Canada lynx	lynx habitat components	Interagency Lynx Biology Team 2013	85. On the lynx range (map located in appendix B), retain all thrifty subalpine fir and Engelmann spruce trees to the extent feasible. 86. Design regeneration harvest prescriptions to mimic the pattern and scale of natural disturbance events. Retain and recruit the understory of small diameter conifers and shrubs preferred by hares. Ensure that no more than 15 percent of a lynx analysis unit (LAU) is changed to an unsuitable condition within a 10-year period.
forest carnivores, big game	roads	Interagency Lynx Biology Team 2013, USDI et al. 1986	87. Keep existing restricted (gated) roads, un-drivable roads, and new temporary roads closed to the public both during and after the project.
			88. Effectively close all temporary roads following project activity by ripping the road prism, and/or installing native materials (boulders, earthen berms, piled slash, etc.) on the road entrance.
	motorized trails		89. Do not protect user-created, off-highway vehicle (OHV) trails within harvest units. Effectively close these trails with fencing, piled logging slash, boulders, earthen berms, or other means.
	hiding cover		90. Hiding cover is defined as vegetation capable of hiding 90 percent of an elk at a distance of 200 feet. Where the opportunity exists, retain strips/patches of shrubs and trees to provide hiding cover on the edges of meadows and along open roads adjacent to created openings. To the extent feasible, maintain the cover value of these vegetative strips/patches during post-harvest site preparation.
big game, landbirds, etc.	wetlands	USDA 1995	91. Maintain no-harvest buffers within 50 feet of all wetlands, ponds, and lakes outside of stream RHCAs. For wetlands, ponds, and lakes >1 acre in size, utilize only single tree or small group selection harvest from the 50 foot no-harvest buffer out to 150 feet. Promote hardwoods or shade-tolerant conifers within this area.
deer	winter operations	Forest Plan page 4-99	92. Restrict timber sale operations that occur in the winter (December 1 to March 31) either to areas north of State Highway 20, or to areas south of the highway, in a given winter.

Target species	Design element	Management framework	Project design criteria
	winter range cover	Forest Plan page 4-98	93. In created openings located on deer winter range, attempt to retain 3+ acre pockets of forested cover, spaced no more than 600 feet apart. Look for opportunities in draws, around wetlands, on benches, and on sheltered aspects.
pileated woodpecker, pine marten, large raptors, landbirds, etc.	old growth stands	Lowe 1995, Green et al. 1992, Altman 2000	94. Do not harvest any stands meeting the North Idaho Zone Old Growth definition.
	large trees		95. Retain live trees 21+ inches in diameter, with the exception of those located within new equipment or road corridors, landings.
	special structures	Bull et al. 1997	96. While providing for worker safety, retain all live trees 14+ inches in diameter that have old raptor nests or broom rusts. Retain up to 20 trees per acre of this size that are; broken topped or hollow, or that contain obvious woodpecker cavities. Some trees may be lost within new equipment or road corridors, and landings.
	hardwoods	Altman 2000	97. While providing for worker safety, retain all hardwood trees. Some trees may be lost within new equipment or road corridors, and landings.
furbearers	travel corridors	Lowe 1995	98. Do not use regeneration harvest within mapped travel corridors.(map located in appendix B) 99. Ensure that project activities within corridors maintain; a) corridor width of at least 400 feet, b) overhead canopy closure within the top third of site potential, c) some understory in patches or scattered to assist in supporting stand density and cover.
primary cavity excavators	snags	Mellen-McLean et al. 2012 (DecAid), Lowe 1995, Bull et al. 1997	100. While providing for worker safety, retain snags that are 10+ inches in diameter. Some of these trees would be felled within new road/equipment corridors, landings. 101. Within created openings (ex. shelterwood harvest), create snags from live green trees in order to mimic habitat levels in un-managed stands as prescribed by the district wildlife biologist (minimum average of 0.5 trees/acre). Snag creation could be accomplished by topping trees with a mechanical harvester, topping trees by hand with a chainsaw, or top-girdling trees with a handsaw and ax. Do not create snags within commercial thinning and other partial harvest units since only a fraction of the green trees would be logged and any existing snags would be much easier to retain.

Target species	Design element	Management framework	Project design criteria
	down logs		102. Do not cut or remove log pieces that are 14 inches in diameter at the small end. Retained logs should be at least 8 feet long. Thus, if a log piece tapers to 14 inches in less than 8 feet, at least 8 feet of that log should be left on site. 103. If not enough 14+ inch material exists to meet the requirements of the Eastside Screens for Timber Sales (Lowe 1995), retain enough smaller material to meet the requirements of the screens. 104. Where there are large concentrations of 14+ inch logs, some logs may need to be cut/moved in order to meet fuel management objectives, allow equipment operation, or for worker safety. Removal of 14+ inch logs from the site would be decided on a case by case basis after consultation between the district wildlife biologist, timber sale administrator, and fuels specialist.

Required Mitigation for TES and Other Wildlife Species

The conservation measures listed in the previous table would be incorporated into the design of Alternative B. The following measures would be necessary under certain conditions to mitigate potential impacts of Alternative B to TES and other wildlife species. These measures have been highly effective when incorporated into similar projects completed on the forest. The ability to implement these actions is high.

- **Protect TES Species and Wildlife Activity Sites** - If a TES species is observed, or a wildlife activity site (den, nest, roost, rendezvous site, etc.) is discovered in the project area, consult with the district biologist on measures required to protect the animal or site.

  Effectiveness: High. Timing: project planning through post-sale phases. Responsibility: all FS employees and private contractors.

Required Mitigation for Sensitive Plants

All treated areas

- If sensitive plant species are found in the analysis area while project activities are occurring, the Forest Botanist or their designee would be consulted as to measures required to protect the species and its essential habitat. Layout personnel would notify Forest Botanist of up-coming or ongoing unit layout.

  Effectiveness: High. Timing: project planning through post-sale phases. Responsibility: all FS employees and private contractors.

Required Mitigation for Recreation

- **Designated open OHV routes** - In cases where it is not possible to leave a vegetative screen or vegetation screening is currently not available (i.e. skyline corridors, existing clearings, etc.), the district recreation officer must be notified to determine what mitigation measures may be required at these locations. Mitigation may include installing fence, rocks, or other barriers. In areas were terrain, existing vegetation or other factors

already prevent off-road travel (cliffs, ravines, etc.), and visuals resources would not be adversely affected, screening may not be required. These areas must be field checked and approved by a district recreation officer ahead of time.

Effectiveness: High. Timing: project planning through post-sale phases. Responsibility: Recreation staff.

Monitoring

Range

- Any new structures installed to manage livestock access would be checked at least once within one year of installation.

Noxious Weeds

- All aggregate and borrow sources would be monitored and inspected by the noxious weed coordinator or a designated representative prior to use to determine if the material is free from noxious weed seeds. If it is not weed free, it is not to be hauled onto or used on NFS lands. All fill material would be sprayed to remove noxious weed seed prior to being used for the project.
- Road closures would not be implemented until weeds have been treated, with the exception of temporary roads. Follow-up monitoring and re-treatment of areas behind road closures and/or decommissioned roads must be conducted, at a minimum, once a year for the first two years after the treatment or until such time as it can be verified that the weed infestation has been effectively treated (Colville National Forest Weed Prevention Guidelines, 1999).
- The noxious weed coordinator would monitor and inventory level 2-5 roads across the project area for noxious weed occurrence. All road surfaces within the project area that receive borrow or pit material would be surveyed for three years following surfacing and appropriately treated.
- Disturbed ground and roads within proposed burn areas would be monitored for 1-3 years post-burn, or until revegetated, by the Forest or District noxious weed program specialist following prescribed fire to assess for the presence of noxious weeds and plan for treatment as necessary.
- Revegetation efforts would be monitored for 1-3 years to ensure successful site revegetation has occurred and reseed if necessary.

Silviculture

- All vegetation management projects would be monitored both during and after treatment to gather site specific information to aid in future project planning. Monitoring would check to see that marking is meeting the prescription and marking guide. Monitoring would also be conducted during harvest operations to ensure that the prescriptions are being met. Post-harvest reviews would be conducted within the 1st year after harvest to identify that the harvest met the prescription and if any changes to the fuels, site preparation, or reforestation are needed.
- 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. Aerial surveys would help to identify any insect or disease populations that were not identified during the planning

process. If bark beetle outbreaks are identified in units during field reviews, the prescriptions may be modified to treat any additional mortality. The surveys would be reviewed by the Silviculturist.

- Natural and artificial regeneration occurring following treatment would need to be evaluated periodically for species composition and numbers of trees per acre. Survival surveys in plantations should be conducted the 1st, 3rd, and 5th year if necessary, to ensure the unit is fully stocked with seedlings. Success for managing fire behavior in the wildland urban interface and future insect outbreaks would depend on the ability to maintain this area in the desired condition following the initial treatments.
- The Silviculturist and Fuels AFMO[8] would review a subset of the prescribed fire and fuels treatments to ensure that residual leave trees are adequately being protected, and the surface and ladder fuels are being reduced to an acceptable level. Actively monitoring of these treatments during project implementation would be necessary to make any changes or corrections as they are identified. Post-harvest monitoring would also be conducted within 1 to 2 years to evaluate any follow up effects from the treatment.

Wildlife

- The district wildlife biologist and forest engineering staff would monitor all roads closed with the project for five years following the timber sale(s). If a given closure is receiving unauthorized motorized use, implement actions necessary to improve the effectiveness of the closure. This could include placing boulders or cement posts on the side of gates to block OHV access, replacing gates with earthen berms or boulders, seeding and planting berms, piling slash or root wads in the road entrance, etc.

Table 3. Comparison of Key Issues and Indicators by Alternative

Key Issue	Measurement	Alternative A No Action	Alternative B Proposed Action
1	Total acres treated within analysis area to improve forest health (commercial & noncommercial)	0	6,090
1	Total acres treated to reduce crown fire risk based on torching index, crowning index, and crown base height (commercial & noncommercial)	0	4,381
2	Culverts replaced or removed to improve fish passage	0	16
2	Miles of road located within RHCAs decommissioned or obliterated	0	3

[8] Assistant Fire Management Officer

IMPLEMENTATION PLAN

The activities described below would be undertaken in addition to the monitoring needs identified in the Forest Plan (Forest Plan, chapter 5) or described previously in this chapter.

- General Responsibilities

  The district ranger has the primary responsibility for implementation of the decision including the monitoring plan. The district silviculturist would be responsible for ensuring that harvest prescriptions are designed in compliance with the project design criteria and Forest Plan direction. The district wildlife biologist would be responsible for ensuring that the necessary monitoring for winter range, snag retention levels, and old-growth dependent wildlife species is accomplished. The east zone fisheries biologist would ensure that fish habitat projects are accomplished. The west zone fisheries biologist, district hydrologist and district silviculturist share the responsibility to ensure that the riparian resource and water quality protection measures are correctly prescribed and placed in the timber sale contract. The district presale forester or forestry technician is responsible for insuring compliance with listed requirements during field and office sale preparation activities. The timber sale officer is then responsible for implementation of these measures.

- Specific Implementation Responsibilities

  Monitoring of project implementation would be the responsibility of forest and district staff as follows:

Activity	*Responsible Position
Preparation of commercial contracts	PF, S, WB, T, FB, A, RS, NW, B
Administration of commercial contracts	SA, ER, S, WB, NW, B
Post-sale activities	S, WB, F, NW, RS, Rec, B
Fire/fuels treatments	F, S, WB, A, RS, Rec, NW, FB, B

WB	Wildlife Biologist	RS	Range Specialist
PF	Presale Forester or	S	Silviculturist
	Forestry Technician	SA	Sale Administrator
T	Transportation Planner	ER	Engineering Representative
F	Fuels Specialist	Rec	Recreation Specialist
A	Archaeologist	NW	Noxious Weed Coordinator
H	Hydrologist	FB	Fish Biologist
B	Botanist		

*Note: The position listed first under Responsible Position generally has primary responsibility.

POSSIBLE SALE AREA IMPROVEMENT PROJECTS

The following listed activities were identified by the various resource specialists as sale area improvements that could potentially be included as part of any contracts resulting from the Renshaw decision. Listing such activities in this Environmental Assessment is required in order

for funding generated by the sale of timber under this EA to be used for the listed sale area improvement activities.

Activities that are included in the selected action (including mitigation measures) for this environmental assessment (Renshaw Vegetation Management Project) may be implemented with timber sale-generated or other funds without further NEPA analysis; however, activities not listed within this EA must be the subject of separate NEPA analysis before they may proceed. It should be noted that "separate NEPA analysis" may include NEPA analysis that has already been completed. The following projects were analyzed by separate NEPA analysis and included in resource specialist reports as reasonably foreseeable actions.

Alternative A (no action) would not result in any implementation contracts.

Various implementation contracts could result from Alternative B to cover projects listed under the alternative description, design criteria and monitoring and could also include the following projects.

Vegetation Management

- Maintenance of select trees including cone surveys, cone collections, and seed extraction to maintain future seed sources that are locally adapted to the site.
- Western white pine pruning to reduce the risk of infection by white pine blister rust.
- Riparian planting for re-establishment and maintenance of Western redcedar and hardwoods in the flood plains and riparian areas where they had previously existed.

Wildlife

The following habitat improvement projects could be completed in the project area dependent on the availability of excess timber sale receipts, stewardship monies, grants, cost-share monies, etc.

- Protect/Maintain Aspen - Use hand crews to cut down small (non-commercial) conifers within selected aspen stands to forestall the aspen trees from being shaded out over time.
- Seed Grasses and Forbs - Seed shelterwood harvest units that are under-burned with the CNF's preferred seed mixes to supplement green forage for wintering big game.
- Maintain Meadows - Use hand crews to cut down small (non-commercial) conifers where they are encroaching into meadows (ex. Tiger Meadows) in order to keep these sites in an open, productive condition for big game and other wildlife. Use prescribed fire to remove encroaching conifers and grass thatch, and to rejuvenate grasses, in homestead meadows.
- Re-vegetate decommissioned/bermed roads - Seed the scarified portions of these road prisms with grasses/forbs/shrubs. Plant conifers and hardwoods on the de-compacted road prisms/earthen berms.

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CHAPTER 3 - Environmental Impacts of the Proposed Action and Alternatives

This chapter provides a summary of the key environmental effects of the alternatives as described in the specialist reports prepared for this project. The analysis and conclusions about the potential effects are synopsized and cited in the respective resource sections. The resource specialist reports, which disclose the full analysis of the direct, indirect, and cumulative effects, are incorporated by reference and are available in the project file, located at the Newport-Sullivan Lake Ranger District Office in Metaline Falls, Washington. This document incorporates by reference the recommendations from the Renshaw Transportation Analysis Report, and the Lost Ruby Watershed Analysis, which were compiled by members of the core interdisciplinary team. This assessment of effects assumes compliance with standards and guidelines established in the Colville National Forest Land and Resource Management Plan (Forest Plan), Regional standards, State and Federal laws, and National policies. The analysis was based on following regulations and requirements found in the 1960 Multiple-Use Sustained-Yield Act, the 1976 National Forest Management Act, the Organic Administration Act of 1897, the Aquatic Conservation Strategy/Inland Native Fish Strategy (INFISH), and the Direction for Neotropical Migratory Landbirds. These standards, guidelines, policies, and laws provide measures which minimize and sometimes avoid adverse impacts, and require rehabilitation of resources affected by Forest programs.

This project is not adjacent to, nor would it have any effect on, existing or proposed wilderness areas, Forest Plan designated roadless areas, or Research Natural Areas.

Biological Factors

Silvicultural Treatments and Forest Health *(Purpose & Need Objective 1; Key Issues 1 & 2)*

Information provided in this Environmental Assessment about Silviculture and Forest Health is excerpted from the Renshaw Silviculture Report by Silviculturist Scott Brogan (July 2014). The full report is available in the project analysis files.

Figure 3. Lodgepole pine stand with large stump from logging in the early 1900s.

Past Management Activity and Disturbance

Past harvest activities occurred during the late 1800s and early 1900s and up to 1970 but were not recorded in the database or easily identified from air photos. The stand destruction fires in 1929 and 1931 removed most of the timber available for harvest, delivering a blow to the timber industry. These conditions, due to the buildup of fuels, supported more intense fires that killed smaller trees and breeched the protective outer bark of larger trees. Some of the residual trees that survived the fires were then logged to support the local mills.

Logging in the early 1900s favored removal of western white pine and western redcedar (Lost Ruby Watershed Analysis 2001). Past harvest activity and western white pine blister rust have reduced the presence of white pine in the watershed. The white pine that is present in the analysis area, outside of more recent plantations, is not from rust resistant stock and is being lost to blister rust. Removal of western redcedar, western white pine, ponderosa pine and western larch before or immediately after the fires in the early 1900s influenced the current stands' species composition due to the lack of an available seed source following the stand replacement fires. Stumps throughout the analysis area indicate that these species were higher in numbers and of larger diameter than the current stand compositions. Grazing by cattle and big game in the riparian habitat conservation areas (RHCAs) has also reduced the return of western redcedar to some of these sites. Lodgepole pine was able to quickly colonize these disturbed sites probably due to some of these trees being left after the logging and their serotinous cones.

The South Deep Fire History Study, completed in the South Deep Watershed, is adjacent to the Lost Ruby Watershed[9], has similar fire regimes and is being used to provide insight into the history within the Renshaw analysis area. Mean fire size during the pre-settlement period (pre 1860) in the South Deep watershed averaged 520 acres in size. Fire size does not imply 100 percent mortality within the fire boundary (South Deep Fire History, Schellhaas et al. 2000). Past timber harvest in stands with sawlog-sized trees has fragmented a portion of the watershed by creating smaller patch sizes than have been represented historically.

Management activities have changed the relative amounts of various species, but the combination of natural regeneration and planting has maintained a diversity of species within the analysis area. Current species composition indicates a higher amount of lodge pole pine and less redcedar, ponderosa pine, larch and white pine than was present before the logging and fires in the early 1900s.

Potential regeneration problems from past harvests in this area include brush competition, mortality caused by blister rust or Armillaria root rot and damage due to foraging by wildlife. Some of the past regeneration harvests over the past 15 years on the Newport-Sullivan Lake Ranger Districts have required a partial replant to certify the unit as restocked. Planting techniques have improved and seedling survival has increased over the years, and percent of regenerated acres satisfactorily stocked after 3 years on the district now range from 83 to 94 percent. Appropriate site preparation activity and timing of site preparation and regeneration activities is expected to minimize the effects of brush competition and provide successful regeneration of the proposed harvest units. Competing vegetation, especially from alder, oceanspray and ninebark, in some of the proposed regeneration units may require manual release. Browsing by wildlife and trampling by cattle is expected to occur at scattered locations throughout the analysis area, but is not expected to create large-scale problems for the establishment of regeneration on the sites. Any proposed planting of redcedar or hardwoods within the RHCA's may need to use vexar tubing, netting or wire cages to prevent browsing damage until the seedlings become established.

[9] The Lost Ruby Watershed Analysis covered the Big Muddy Creek, Lost Creek, west half of Maitlen Creek, and Ruby Creek subwatersheds. Both Big Muddy Creek and Ruby Creek subwatersheds are outside of the Renshaw project area. The Hydrologic analysis for the Renshaw project is limited to the Lost Creek and west half of the Maitlen Creek subwatersheds.

Affected Environment

Current vegetation has been influenced by past fires, homesteading, mining and logging activity. Past fires and logging have created a mosaic of stands. These stands are primarily single storied. In some stands where the overstory has been reduced either by logging or natural disturbances (insects, diseases or windthrow), shade tolerant regeneration is becoming established in the understory. Approximately 99 percent of the analysis area was burned by wildfires in 1929 and 1931. No large-scale fires have occurred within the analysis area over the past 83 years. Forest vegetation, mainly trees that developed after the fires, are uniform in age and structure over thousands of acres. Fire suppression activities over the past 80 years have contributed to a general trend toward denser understory vegetation (shade tolerant tree species) in many areas (Watershed Analysis 2001) and a dense overstory. Also with fire exclusion areas that were historically maintained as open, park like stands are now becoming closed canopy stands or have developed an understory, and brush/grass fields are now becoming stocked with conifers.

Some of the stands resulting after the stand-replacement fires are now densely stocked small diameter stands. Most trees in these densely stocked small diameter stands are less than 8 inches in diameter, and less than 10 feet from neighboring conifers. Many of the stands within the analysis area contain a majority of lodgepole pine, which is a relatively short-lived species. The continuity and species composition characteristics of these lodgepole pine and densely stocked small diameter stands favor cyclic stand-replacing fires and consequently, their perpetuation. Lodgepole pine now occupies more area, and composes a higher portion of the standing biomass than it did historically. These lodgepole pine trees are now of a size and density that they are susceptible to mountain pine beetle (MPB) attacks. Endemic MPB populations have occurred in the analysis area as noted by field recon and insect aerial detection flights over the last decade. Currently there are outbreak conditions from MPB in LP to the north of the analysis area.

Figure 4. Densely stocked small diameter stand in the Renshaw project area.

Hardwood species, especially quaking aspen and paper birch, are declining in vigor and beginning to drop out of the species mix. Large stands of paper birch have been top killed by the bronze birch borer, which would lead to mortality of these trees. Hardwoods are relatively short-lived (typically less than 100 years). They are maintained by moderately frequent disturbances, such as fire. As these hardwoods decline the seed source available to regenerate them may be lost and they may have to be re-established artificially.

Ecosystem Screening for the Renshaw Analysis area

Biophysical Environments

There are five biophysical environments within the Renshaw analysis area: warm dry Douglas-fir shrub, cool mesic western redcedar/western hemlock forb-shrub, cold dry/mesic subalpine fir shrub, cold mesic subalpine tall shrub, and very moist western redcedar/western hemlock bottoms.

Characterization of the landscape pattern of plant communities and seral stages were evaluated for the analysis area. This assessment, using Eastside Screens, compared the current structural stages with the historical range of variability (HRV). Historic range of variability calculations apply only to National Forest System lands, (Devlin 1998, 1999). The HRV calculations excluded National Forest System lands that are unsuitable for timber production, rock outcrops, wetlands, meadows, nonforest and lakes. The historical range of variability was developed by a team of specialists from the Colville and Okanogan National Forests and was based on conditions in the pre-settlement era (Berube and Kovalchik 1995).

The following table shows the percentages of each biophysical environment in the analysis area, this is similar to the results found in the Lost Ruby watershed analysis.

Table 4. Percent of Area by Biophysical Environment

Biophysical Environment	Percent
Group 3 Warm Dry Douglas-fir Shrub	5
Group 7 Cold Dry/Mesic Subalpine Fir Shrub	1
Group 8 Cold Mesic Subalpine Fir Tall Shrub	1
Group 11 Cool Mesic Western Redcedar/Western Hemlock Forb-Shrub	87
Group 12 Very Moist Bottoms Western Redcedar/Western Hemlock	6
Total	100

Warm Dry Douglas-fir Shrub
Approximately 656 acres of this biophysical environment is found within the Renshaw analysis area, mainly on south-facing slopes of ridges that run east-west.

The forests in this biophysical environment consist of Douglas-fir and ponderosa pine, with western larch and grand fir on the more moist sites.

Historically this biophysical environment had stand-replacing fires, so fire suppression has not produced conditions completely different from pre-settlement times. What has changed is the extent and continuity of these conditions. Stands with dense grand fir and Douglas-fir understories have become wide spread. Insect outbreaks and root disease have become common.

Cold Dry/Mesic Subalpine Fir Shrub
This biophysical environment occurs on about 101 acres within the Renshaw analysis area.

This habitat type can be found at elevations as low as 4600 feet and as high as 6900 feet. The sites are dry, often because of the position they occupy on the slopes. Subalpine fir and mountain hemlock are the climax species. Currently these sites in early succession are usually dominated by lodgepole pine or a combination of other tree species, including Douglas-fir, Engelmann spruce, grand fir, western larch, and western white pine.

A history of stand-replacing fire is almost universal in subalpine stands, but historic fires were variable in extent and behavior. Fires in this environment are often suppressed because of their potential to become large, but exclusion of fire removes an important source of landscape diversity. Without fire the subalpine environment progresses toward dominance by climax species. Where duff and woody fuels have accumulated, especially after insect or disease mortality, lightning ignitions can smolder for a long time so that probability of fire spread increases. Conifer reproduction under the mature canopy increases the likelihood of crown fire, heavy dead and down fuels increases the likelihood of a severe surface fire.

Cold Mesic Subalpine Fir Tall Shrub
This biophysical environment occurs on about 103 acres within the Renshaw analysis area.

This biophysical environment occurs on northwest to east facing slopes, poorly drained subalpine sites, and moist frost pockets. Lodgepole pine is an important early seral species in some stands, but it is almost completely gone after 160 years (Cooper et al. 1991). Western larch is not widespread in this environment probably because of poor drainage conditions. Douglas-fir, lodgepole, Western larch and grand fir currently occur on these sites. Mature forests are usually dominated by Engelmann spruce, subalpine fir, and mountain hemlock.

Because of the long fire free intervals characteristic of this biophysical environment, natural development has generally not been affected by past fire suppression (Habeck and Mutch 1973). On a landscape level, however, it is likely that more area is in mature stages of development, fuels are more continuous both horizontally and vertically, and tree mortality from insects and diseases is greater than in pre-settlement times. Fires in this environment are often suppressed because of their potential to become large during periods of severe burning conditions. Surface fires can persist for weeks in the deep duff and have the potential to generate large, stand replacing fires under very dry conditions. Fire may be used to reduce fuel loads and increase variation in stand structure.

Cool Mesic Western Redcedar/Western Hemlock Forb-Shrub
The Renshaw analysis area contains approximately 11,412 acres in this biophysical environment.

This habitat type is widespread on valley bottoms and lower slopes. It may also extend to elevations as high as 5200 feet, and where precipitation is plentiful can be found on slopes of all aspects. These areas usually contain a mixture of climax species of western hemlock and western red cedar. Other seral tree species include Douglas-fir, Engelmann spruce, grand fir, lodgepole pine, ponderosa pine, subalpine fir, western larch, and western white pine.

The path that succession is likely to follow in this biophysical environment depends on the site itself, the species present before the fire, the size and intensity of the burn, and post burn conditions. One pathway describes succession in stands where both seral and climax species become established soon after stand-replacing fire. This is common in stands with longer fire return intervals and moderate moisture and temperature regimes. On sites with poor drainage, shorter fire return intervals, and frosty temperatures, lodgepole pine occasionally dominates early succession in nearly pure stands. The pines are so dense and grow so rapidly that they overtake and suppress other conifers for many years. Finally, another pathway describes succession where moist climatic conditions, long fire return intervals, or uncertainties of seed source and fire effects enable shade-tolerant species to dominate immediately after disturbance.

Historic fires recycled carbon and nitrogen stores and prevented forest diseases from reaching epidemic proportions. Even though severe fire can decrease site productivity, it may not be as detrimental to long-term forest health as continued fire exclusion (Harvey et al. 1993). Prescribed fire may be able to mimic some natural fires, and fuels management activities may enable more opportunities for prescribed fire.

Very Moist Bottoms
The Renshaw analysis area contains approximately 787 acres in this biophysical environment.

The habitat types of this biophysical environment occupy very moist sites in isolated patches. Most are in valley bottoms or on lower slopes with high water tables. Very large western red

cedar and western hemlock trees dominate old-growth sites. Grand fir and Engelmann spruce are important seral species. On these moist sites, maple, alder, devils club, scouler willow, and pacific yew can grow very large.

Structural Stages

There are seven structural stages identified under the Regional Forester's Forest Plan Amendment #2: Revised Standards for Timber Sales on Eastside Forests (Lowe 1995). All structural stages are represented in varying proportions in the analysis area with the exception of structural stage 7. Variations in structural stages are a result of fire, insects, diseases, harvest disturbances, weather (precipitation level, wind, etc.) and stand development.

Table 5. Structural Stage Definitions

Structural Stage	Definition
1, 2, 3 (early)	Stand initiation through stem exclusion. These early stands are fully stocked by conifer trees that may range in size from seedlings through 15” diameter trees. The distinguishing characteristic is that all the trees are near the same age (same cohort), and all the trees are in the same canopy layer. A second canopy layer of shade tolerant trees has not yet started to develop in the understory.
4, 5 (middle)	Understory reinitiation and multi-stratum without large trees. A second cohort of trees is established under an older overstory in these middle stages. Openings start to appear in the canopy, and the amount of down wood increases. The trees in the overstory are typically early seral (larch, pine, Douglas-fir, etc.) while the trees in the understory are typically shade-tolerant (western redcedar, hemlock). The stand may contain many sizes of trees, but large trees are uncommon.
6 (late)	Multi-stratum with large trees. These late and old stands contain two or more cohorts of trees, and trees of all sizes are present. The overstory canopy is discontinuous, and large trees are common (8 trees per acre >21” dbh)
7 (late)	Single-stratum with large trees. A single layer of large seral trees is present in this late and old stage. The understory may be absent or may contain sparse or clumpy seedlings and saplings. These stands are sometimes called park-like.

The following table compares the historical range of variability as compared to the current condition within the analysis area.

Table 6. Biophysical Environment-Structural Stage Matrix

Biophysical Environment	Early Stage 1, 2, 3		Middle Stage 4, 5		Late and Old Stage 6		Late and Old Stage 7	
	H %	C %	H %	C %	H %	C %	H %	C %
Warm Dry Douglas-fir shrub	10-25	3*	10-25	94*	5-20	3*	30-75	0*
Cold Dry Mesic subalpine fir shrub	15-45	2*	35-75	98*	10-30	0*	2-5	0*
Cold Mesic subalpine fir tall shrub	10-35	1*	30-60	99*	25-50	0*	NA	0
Cool Mesic western redcedar/western hemlock forb shrub	10-30	4*	20-50	94*	30-70	2*	NA	0
Very Moist Bottoms	5-30	1*	10-50	99*	30-90	0*	NA	0

H = Historical Range
C = Current Condition
* = Denotes currently outside of the Historical Range of Variability

The analysis area currently is below the historical range of variability (HRV) for old structural stage stands of both multistory (SS6) and single story open park like Douglas-fir, western larch, and/or ponderosa pine (SS7). This lack of open park-like stands can be attributed to fire suppression, insects and past harvest activities that did not create open stands, and or the lack of maintenance of the developing shade tolerant understory.

Old Growth

Due to logging in the late 1800s, 1900s, and stand-replacing fires between 1926 and 1931 (Colville National Forest Large Fire History by Decade GIS imagery 2004), large areas of evenaged western larch, lodgepole pine, and Douglas-fir exist. Stand ages are typically 75 to 90 years old for the overstory with an occasional western larch, Douglas-fir, western red cedar, western hemlock or ponderosa pine remnant 150+ years old. These living remnants and all live trees greater than 21 inches DBH have been identified to be retained for current and future diversity (Lowe 1995).

The analysis area was analyzed using the North Idaho Zone definitions for old growth stands (NIZOG). Only one stand (5110020) within the analysis area appears to meet the North Idaho Zone definition for old growth and would be excluded from commercial treatment. If any stands are identified as old growth during future reconnaissance or unit layout, they would be excluded from any harvest activity.

Forest Health Analysis

The disease and insect field review conducted by the zone entomologist and pathologist noted many forest insects and pathogens that are currently residing in the analysis area. The field reviews concluded that the greatest potential for future insect-caused damage within the analysis area is from mountain pine beetles in lodgepole pine. Mountain pine beetles have killed and are continuing to kill numerous lodgepole and ponderosa pines within the analysis area. The field reviews noted that mountain pine beetle, western balsam bark beetle, pine engraver, fir engraver and Douglas-fir bark beetle were the most observed insects. Western larch dwarf mistletoe, white pine blister rust, western gall rust, foliage diseases, and Armillaria root disease were the most observed pathogens in the analysis area. Based on the field reviews, aerial surveys and observations the analysis area is likely moving rapidly toward an outbreak of mountain pine beetle.

Figure 5. Evidence of Mtn. pine beetle attack: pitch tubes on the tree, and boring dust at the base.

A large portion of the Renshaw analysis area contains an overstocked lodgepole component that is moderate to highly susceptible to mountain pine beetle attack. These lodgepole pine stands would continue to increase in risk of attack over the next 10-20 years. Lodgepole are considered at risk to mountain pine beetles when the stand

reaches 80 years old, the diameter at breast height (DBH) is 8 inches or larger and the stand basal area is 80ft^2 /ac or greater.

Ponderosa pine is a minor component throughout the analysis area, and many are declining due to stress from overstocking and encroachment from more shade tolerant species. The ponderosa pines are also at risk from fire caused mortality unless the current fuel loads and risk of a stand-replacing fire event are reduced. Some of the ponderosa pine within the watershed was brought in from the Black Hills of South Dakota. These ponderosa pines were planted following the fires and salvage efforts in the 1920s and early 30s. These older ponderosa pine plantations are experiencing very high mortality from root and needle pathogens because of the off-site seed source. These poorly adapted off-site trees have reached sexual maturity, and their genes are contaminating the native ponderosa pine stands through the spread of pollen and seed (DeWald and Mahalovich, 1997).

Another result of overstocked stands is a preponderance of suppressed trees. These trees, especially shade intolerant species such as larch, lodgepole pine and ponderosa pine, see a decrease in their live crown ratios due to being over-topped by the more dominant trees. Once the live crown ratio falls below 35 percent, there is a decreasing probability that the tree would release through thinning and gain its live crown back. Many of the suppressed trees also develop poor height:diameter ratios when they grow and can’t increase their diameter fast enough due to tight growing conditions. When the height:diameter ratio exceeds 100, the trees are more susceptible to windthrow and snow breakage.

Landscape Considerations

While the project area contains stands which can be classified either as mesic or dry, overall the landscape defined by the project area would be classified as mesic. This is not based on the existing cover types as much as it is based on the plant associations. Whether a stand is dry or mesic is mostly due to aspect, topographic position and soil type.

A mesic landscape is usually quite variable in terms of species composition, patch sizes and structure. While a dry landscape is greatly influenced by fire, the mesic landscape is influenced by several disturbance agents. Insect and disease outbreaks, storm damage and fire all play a role in creating the “mosaic” of conditions found in the mesic landscape. Fire occurs as a “mixed fire regime” where size, intensity and fire return interval is quite variable.

There are many attributes, which could influence whether or not fire might create a large-scale stand replacement event. The amount, size and juxtaposition of early seral patches where more frequent low intensity fires can occur would provide breaks in the continuity of patches where less frequent high intensity fire could occur. These areas would be dominated by ponderosa pine, Douglas-fir and larch.

The Renshaw area has seen changes from a landscape perspective since the time of early settlement in the Pend Oreille valley. The fires that occurred between 1926 and 1931 were stand-replacement fires that occurred over the majority of the analysis area (Colville National Forest Large Fire History by Decade GIS imagery 2004). Since this stand-replacing fire event the area has missed at least 1 cycle of wildfire, which would have kept this area more open and less stocked. Numerous fire starts have occurred in the area and some have been suppressed by local fire resources or rainfall. It is likely that if the wildfires were not suppressed it would have had created some early seral patches, reduced stand density by thinning the fire intolerant species and reduced fuels within the area. Although within the urban interface, the scenic corridor and the

timing of fire starts it is difficult to allow wildfires to burn unchecked. Mechanical treatments and prescribed fire under controlled conditions are more desirable then a wildfire to restore the landscape.

Looking at the departures from a historical context we can identify needs for restoration of attributes deemed important for ecosystem function. Much of the science related to this has developed within the last 15 years, well after the present Forest Plan. As a result, there are no standards, guidelines, goals etc. regarding landscape management. The Forest Plan amendment that introduced the Eastside screens looks at stand structure but does not go as far as looking at other attributes of landscape function such as species composition, patch size, fire behavior variables, etc. There are also no Forest Plan requirements to practice restoration. However, within this context, the current Forest Plan needs to be considered with regards to wildlife habitat, scenery management, hydrology, soils, fisheries management etc.

Direct and Indirect Effects of Alternative A

This alternative would result in no improvement in stand vigor and related forest health or moving the stands toward target condition on National Forest System lands. Stagnated stands within the project area left untreated would lack adequate crown and diameter development and reduced future growth. Hardwoods would continue to be outcompeted by conifers and reduced across the landscape. Structural development would be delayed due to the suppressed or nonexistent understory. Offsite ponderosa pine would not be reduced. This offsite ponderosa pine would continue to cross pollinate with local ponderosa pines and the resultant offspring would continue to be more susceptible to insects and disease caused mortality at a higher rate than the local ponderosa pine. Development of wildlife habitat would be delayed if the stands were left untreated. No treatment would also delay moving stands toward the historical range of variability especially in stands that would be treated to move towards structural stage 6 or 7. Insect and disease activity would continue to contribute to increased mortality and result in an increase in ladder and crown fuels and increased buildup of surface fuels. Dead or dying trees as a result of insects and diseases will have reduced foliar moisture content, which would allow fires to spread rapidly through the crown, especially if they are recent dead with a red crown.

Stands would continue to be a high risk to uncharacteristic fires. If a stand-replacing fire were to occur, many of the preferred early seral leave trees i.e., western white pine, western larch and ponderosa pine would be killed by the fire and the site would be delayed in moving towards stage 6 or 7. Natural fires may or may not burn under conditions that would thin out the smaller trees and would have limited control over residual tree spacing and species selection. High intensity fires can reduce soil productivity drastically and cause major changes in the hydrological and erosion processes (Hessburg et al. 1999). Severe fires can also cause stand destruction and create potential brush fields that may last for many years.

Conversion of stands to shade tolerant species would continue, increasing the future hazard to insects, diseases and stand replacement fires. This alternative would not treat stands that occur along the urban interface to reduce the risk of insect, disease or wildfire spread. Since no harvesting would take place the economic value of the dead and dying trees would not be realized. There would be no funding generated from timber sales to help the local economy, aid in monitoring, stand improvement, wildlife, fisheries, recreation and fuel reduction projects. Within the next ten-year period the risk of insect outbreak and the risk of increased levels of disease are moderate to high. In the long term, the risk of insect outbreak in the next ten to twenty years would be approaching high. Forest health and resilience to disturbance would suffer from no treatment.

Direct and Indirect Effects of Alternative B

This alternative proposes both commercial and non-commercial treatments to meet the purpose and need and to move the area towards the desired future condition. Unit boundaries are somewhat approximate as the project is actually laid out on the ground, conditions such as unmapped riparian areas, heritage sites, local changes in logging system design and road design, sensitive wildlife areas, etc., would cause changes in acreage and the shapes of the polygons.

Approximately 6,090 acres (46 percent) of the 13,118 acres in the project area would receive some type of silvicultural treatment to improve stocking levels, stand vigor, move the stands toward target condition and towards the historical range of variability of structural stages. Highly stocked stands would be treated to reduce the future hazard of insect and disease outbreaks and to modify the expected fire behavior if a wildfire were to occur.

Alternative B would treat approximately 2,085 acres or 62 percent of a total of 3,368 acres that were identified as high priority for treatment due to forest health concerns. In addition to the high priority stands, an additional 1,195 acres, or 32 percent out of a total of 3,765, acres of moderate priority and 2,810 acres, or 75 percent of 3,707 acres, of low priority stands would be treated. Approximately 6,582 acres were identified that contain a dominant LP component. Alternative B would treat approximately 3,370 acres or 51 percent of these LP stands.

Reducing the stand density levels, species selection and reducing surface, ladder and crown fuels would be better accomplished through harvesting than by using prescribed fire alone. Prescribed underburning and site preparation treatments under controlled conditions would reduce the continuity of fuels and manage the fuel loads, which would reduce the hazard of a stand replacement fire. The underburning would be accomplished under optimum fuel moisture levels to reduce the impact to the residual stand, protect the soils, maintain fire tolerant species, reduce fire intolerant regeneration and maintain stocking levels. Encroachment of shade tolerant species could be reduced by repeated, periodic underburning, especially on the drier sites (see fire/fuels specialist report–Hicks 2014).

In general, thinning and selection harvests would keep the retained trees growing more vigorously and thus would allow them to be more resilient and more resistant to an insect or disease attack. Trees which would not live until the next entry, trees with live crown ratios less than 35 percent, trees with height to diameter ratios greater than 100, and trees with mechanical defects, are preferred for removal over trees with vigorous healthy crowns with relatively few defects. Some exceptions would be allowed to provide for trees used by certain wildlife species. Removal of trees through thinning can also be used to control the species composition of the stand. Shade tolerant trees that have a low tolerance for fire can be discriminated against and shade intolerant seral species which are more fire tolerant can be favored. There would also be exceptions to this such as in the case of developing thermal cover for big game and for providing shade adjacent to riparian areas.

Shelterwood and small group selection harvests generally would be used where an intermediate harvest would not increase the stand resilience or make them more resistant to an insect or disease attack.

Stands deferred from harvest activity in this entry would still be at risk of insect and disease outbreaks. Using only a sanitation or salvage harvest in areas killed by an insect outbreak or in Armillaria root rot pockets would do little to minimize crown fire initiation or spread (Graham et

al. 1999). These areas would continue to remain overstocked and at risk for a high intensity stand replacement fire.

Hazard trees along the roads, for a distance of 200' on either side, would be evaluated for removal. Removal of these hazard trees would provide added safety for the users of the roads within the analysis area. Hazard trees along the roads would be evaluated by trained personnel to determine if they need to be removed. Some of the conditions that tend to create hazard trees are; root sprung trees as a result of wind or snow loads, severe leaning trees, internal decay as a result of root rot or fungus, dead trees or dead top trees resulting from bark beetles or other damaging agents, forked top or physical defects, and severe dwarf mistletoe infected trees. These hazard trees when identified may be yarded to the road for removal.

Treatments within RHCAs are proposed to reintroduce riparian vegetation, such as Engelmann Spruce, western redcedar, western hemlock and hardwoods within the RHCA's and flood plains where they historically existed. Treatments within the RHCA's would increase diameters of leave trees to provide shade and future large woody debris and reduce the short-lived lodgepole pine component.

Alternative B allows the opportunity to release aspen trees and clones which are being suppressed by conifers. If the area to be released is expanded beyond the outermost aspen trees, then the probability that some aspen regeneration would occur is increased. Additional disturbance such as underburning would most likely further the reproductive response.

This alternative provides for reforestation with western white pine, western larch and ponderosa pine in the regeneration harvest units. Harvesting some of the dead and dying trees, while still maintaining snags to meet the 100 percent potential population levels of primary cavity excavators, and thinning to reduce stocking levels would recover some of the economic value of the wood (Trimble, 2014). This economic return could be used to aid in monitoring, stand improvement, wildlife, fisheries, recreation and fuel reduction projects. This alternative is estimated to produce 29 million board feet of timber. Treatments along the urban interface would aid in reducing the risk of insect, disease and fires spreading from Forest service lands onto private and other ownerships lands. Also these treatments would help to protect the Forest Service lands along the urban interface from these agents, which may spread from private or other ownership lands.

All offsite ponderosa pine that was planted during the CCC era, where they can be accessed and in the proposed units, are proposed for removal.

When considering the effects of alternative B against the existing structural stages, there would not be any change in the currently identified late structural stage stands, since no harvesting is proposed in these stands within the analysis area. Most of the analysis area is currently in the middle structural stages. Alternative B would treat acres that would move these stands towards a future late structural stage and would provide more structural diversity in the short term. Alternative A would change more slowly from the current condition and would lose structural diversity in many areas due to forest health issues. Stands with a thinning or selection harvest prescription would develop structure relatively quickly as the larger trees are released and diameter growth can be increased. Most of the larger trees would be retained and small gaps that are created would encourage new trees to initiate. The areas dominated by mature lodgepole or small diameter dense stands would be regenerated as the quickest way to move the stand towards late or old structure. In these areas, large existing seral species trees would be retained to maintain some structure. Seral species such as ponderosa pine, western larch and western white pine would

be planted. It is expected that some natural Douglas-fir and lodgepole pine regeneration would occur which would supplement the trees that were planted. During the development of this stand regular thinnings would occur to maintain the growth rate on these trees.

Roads are an important part of necessary infrastructure used to carry out the management activities proposed with Alternative B. Road reconstruction and temporary road construction in the analysis area would aid in access to proposed treatment areas. Temporary road construction would be closed following treatments but may still reduce the growth potential of conifers in the near future due to displacement and compaction of the soil. Reduced tree growth on these temporary roads would be less than the benefits of treating the larger areas they would provide access too. These temp roads may be reopened and used for future access to areas where they are developed and make it more economical to do intermediate silvicultural and fuels treatments to meet our management direction. Following implementation of proposed regeneration units, a commercial entry would not be anticipated for approximately 40 years. Most of these stands would require a subsequent entry in about 15 to 20+ years.

Two options were developed for the Rocky Creek road (County Road 4699). Option 2 to reconstruct Rocky Creek road and replace the bridges or Option 1 to construct a new road to relocate the Rocky Creek road that currently is located adjacent to Lost Creek and obliterate the old road. Option 2 would not reduce any additional acres from the manageable timber base. Option 1 would reduce some acres from the manageable timber base for the new road location. Decommissioning the old road would add back some if not most of these lost acres for growing trees. This road relocation would reduce the impact to Lost Creek in the long term by decommissioning the old road and moving the road away from the riparian habitat conservation area adjacent to the creek. Access to manage stand vegetation and fuels south of Lost Creek would still be available by reopening temporary roads and then decommissioned following their use. With the relocation and decommissioning of the old Rocky Creek road there would be a minimal loss in acres available for treatment.

Another issue that has surfaced recently due to the high cost of energy is the removal of biomass material. This material is sub-merchantable green trees or cull logs which would not make any other type of product. A certain amount of material that would provide for nutrient recycling should be retained. Also, whether or not the material is removed when the sawtimber products are removed or if a second entry would be needed could affect future tree growth within the stand where the activity takes place. This would be due to additional soil compaction effects from heavy equipment, especially if the biomass entry is done without a slash mat or if the activity occurs during a period when the ground is not frozen or there is adequate snow cover.

From time to time disturbances such as fire, wind, insects, diseases, heavy snow can cause mortality. Salvage harvest can be used as a tool to reduce future impacts that may occur by leaving these dead and/or dying trees in place. In certain areas fuels buildup, trees which harbor broods of insects which can cause large areas of mortality when their populations explode, or trees that jeopardize the safety of workers using certain roads should be considered for salvage harvest.

These areas cannot be planned for ahead of time as the locations could occur anywhere. The highest priority for treatment should be given to areas adjacent to open roads, restricted roads where project sale and post-sale activities have or are occurring. In most cases, the area within 200 feet of the road could be harvested without any additional constructed roads or main skid trails. The appropriate specialist would provide input to ensure that the salvage harvest is

consistent with Forest Plan direction and their analysis and project design for the Renshaw project EA.

There is a direct relationship with stocking level control and stand vigor. As more acres of the slow growing or stagnant stands are brought under stocking level control, stand vigor would improve. Insects and diseases can be species specific in the range of hosts they would attack. By maintaining a species mix that contains multiple species within the stand, the risk of stand loss to any one single insect or disease is reduced. Therefore, by controlling stocking and species mix, stands would be more resilient to insect and disease attack, and recreation, scenic, timber and winter range goals are more likely achieved.

Cumulative Effects

Past and proposed vegetation treatment activities on both private and public lands within the Renshaw analysis area in the next 5-10 years were considered during this analysis and would have an effect on reducing the risk of insect and disease caused mortality. The risk of an outbreak of insects and disease is generally reduced as more acres within the analysis area are managed by using a combination of commercial and noncommercial stand treatments, and reintroduction of fire. These vegetation activities that reduce stand density, increase stand vigor, and maintain fire tolerant species within the planning area would have an effect on reducing the risk of insect and disease caused mortality for at least 20-40 years. The past and proposed vegetation treatments would result in up to 59 percent of the analysis at a reduced risk of an outbreak of insects and disease.

With implementation of design criteria listed in Chapter 2, Alternative B would meet Forest Plan direction for vegetation management.

Fire/Fuels *(Purpose & Need Objective 2; Key Issues 1 & 2)*

Information provided in this Environmental Assessment about Fire and Fuels is excerpted from the Renshaw Fire/Fuels Report by Assistant Fire Management Officer Brian Hicks (July 2014). The full report is available in the project analysis files.

Historical research of the area surrounding this watershed indicates large fires were likely a natural occurrence prior to settlement in the early 1900s. Due to fire suppression, fires in this area have been limited to relatively small events. With so little acreage actually burning since 1931, it appears that fuel loading within the project area is now higher than it would have been had the fires not been suppressed. Given that the fuel loading is higher across the landscape, the risk of a larger more intensive and possibly damaging fire has also increased. Qualitative comparisons with aerial photographs from the 1930s to 2009 indicate a general trend of afforestation, or 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 in 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. These shifts have considerably affected the warm-dry stand types with a relatively dense mid and understory component of grand fir, Douglas-fir and western red cedar.

Affected Environment

Fire Regime and Fire Regime Condition Class

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.

Fire behavior and vegetation response is classified into three broad categories based on the severity of the fires 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, the 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 7. Description of Fire Regime Condition Class

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.
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.
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.

Fire regime 1 (high frequency, low severity fire regimes) are those with a relatively short fire return interval (<35 years) and low fireline intensity. These fires have little effect on soil heating or overstory vegetation. Typically, 90 percent or more of the overstory vegetation survives this kind of fire (Morgan et al. 1996). With a potential historic fire-return interval of 5 to 35 years, up to 10 fire cycles may have been eliminated from this ecosystem. Fire regime 1 occupies approximately 4,584 acres or 35 percent of the Renshaw analysis area.

Fire regime 3 (mixed or moderate severity fire regimes) is the most complex fire regimes to categorize, as the fire frequency and fire effects are variable across the landscape. Mixed severity fires are those with an intermediate return interval (35 to 75 years) and have a variable fire severity. Fire regime 3 occupies approximately 2,151 acres or 16 percent of the Renshaw analysis area.

Fire regime 4 (mixed to high severity fire regime) is typically positioned on the landscape where the opportunity for ignition is limited. In the Renshaw analysis area, shade-tolerant plant

communities in moist or wet zones characterize these fire regimes. Only in droughty years does fire enter these stands and burn with lethal intensity (100+ years). Fire regime 4 occupies approximately 6,358 acres or 48 percent of the Renshaw analysis area. (Colville National Forest Plant Association Group - GIS imagery, 2004).

Fire regime condition class (FRCC). The FRCC is used to describe the degree of departure from the historic fire regimes that results from alterations of key ecosystem components such as composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, grazing, introduction and establishment of non-native plant species, insects or disease (introduced or native), or other past management activities. Table 7 describes the attributes of each FRCC. The FRCC was determined using stand exam data, Colville National Forest Plant Association Groups (PAG) imagery and local historical fire history records. It is important to note that the FRCC is highly variable across the Renshaw analysis area; as with vegetation structure and composition, minor changes in slope, aspect, or topographic position can have dramatic effects on the vegetation potential of the landscape. PAG imagery, a tool designed for landscape scale assessment does not always identify this variability at the project scale.

Existing Fire Risk Conditions

Approximately 6,358 acres or 48 percent of the analysis area is best described as fire regime 4, which is found predominately in the high severity western red cedar, grand fir, and western hemlock community types. Stand structure is largely multi-strata. Fire frequencies are at or near their historical range (condition class 1) or they have departed from historical frequencies by more than one return interval (condition class 2) resulting in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape pattern. Vegetation, structure and composition have also been moderately altered from their historic range (i.e. increasing ladder fuel component composed of fire intolerant species). In these areas we are at or near the historic range of variability (HRV) condition class 1, but will soon be moving into condition class 2.

Approximately 4,584 acres or 35 percent of the analysis area is categorized as fire regime 1, found mostly in the high frequency; low severity ponderosa pine stands to mixed severity ponderosa pine, Douglas-fir and western larch, and grand fir community types. Fire frequencies have departed from historical frequencies by more than one return interval (condition classes 2 and 3) resulting in moderate to dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape pattern. Site visits indicate approximately 75 percent of these stands are currently in a dramatic departure from the HRV.

Approximately 2,151 acres or 16 percent of the analysis area is categorized as fire regime 3, found mostly in the mixed or moderate severity with a fire return interval of between 35-75 years. In these areas we are experiencing a moderate to dramatic departure (condition classes 2 and 3) from the HRV.

Surface, Ladder and Crown Fuels

Fuels are made up of the various components of vegetation, live and dead, that occur on a site. The type and quantity often depends on the soil, climate, geographic features, and the fire history of the site. Important components include the litter and duff layers, the dead-down woody material, and grasses, forbs and shrubs (also known as surface fuels); tall shrubs, understory trees and lower limbs of overstory trees (ladder fuels); and overstory shrubs and trees (crown fuels).

Various combinations of these components define the major fuel groups of grass, shrub, timber and slash.

Surface fuel loading, size class, distribution of the load and its arrangement (compactness or bulk density) often govern whether an ignition could result in a sustaining fire. Horizontal continuity influences rate of spread. Fuel size and depth and its vertical arrangement may influence flame height and the ability of a surface fire to transition into the overstory or crown fuels. The ability of a surface fire to spread into the crown fuels is also highly dependent on the height, arrangement and density of both understory trees/shrubs and lower crowns of the overstory trees (i.e. crown base height). The ability of a fire to spread horizontally within the overstory canopy is a function of the density and arrangement of the crown fuels or crown bulk density.

Effects Analysis

Management Framework

In 2001, the U.S. Congress funded the National Fire Plan to reduce hazardous fuel and restore forests and rangeland. In response, the Secretaries of Agriculture and the Interior, along with Western Governors and other interested parties, developed a 10-year strategy and implementation plan for protecting communities and the environment. This plan, coupled with the Guidance for Implementation of Federal Wildland Fire Management Policy (2009), forms the framework for Federal agencies, States, Tribes, local governments, and communities to reduce the threat of fire, improve the condition of the land, restore forest and rangeland health, and reduce risk to communities. The federal fire policy implementation strategy (Interagency Strategy for the Implementation of Federal Management Policy, June 20, 2003) states that, “Overall direction is provided to the wildland fire management program by land management plans (LMP). The paramount policy is firefighter safety. Fire regime dynamics also influence land management objective development in the LMP. The LMPs desired future condition may incorporate the desired mix of condition classes by fire regime.” The Forest Plan provides broad direction on the use of prescribed fire and mechanical fuel reduction treatments by resource management area.

This analysis also considers information and objectives found within the Pend Oreille County, Washington, Community Wildfire Protection Plan (CWPP). The CWPP was developed by the Pend Oreille County Interface Wildfire Mitigation Plan Committee in cooperation with Northwest Management, Inc., and represents the efforts and cooperation of a number of organizations, agencies and county citizens.

Direct and Indirect Effects of Alternative A

A No Action alternative would continue with a management policy of fire exclusion. This would result in no improvement in stand vigor and related forest health. Afforestation, inter and intra-stand stocking levels and crown fire potential would continue to increase. (Keane et al. 2002).

Effect on Fire Regime Condition Class (FRCC)

The shifts in composition away from the more open forest environment under the no action alternative would continue to stress the overstory fire-tolerant cohorts, and (at the landscape scale) would not move FRCC 2 and 3 stands toward the FRCC 1 target. Overall, the drier stand types would continue to gain biomass, and the understory cohorts would greatly increase ladder and crown fuel connectivity (Keane et al. 2002).

A No Treatment alternative would continue with fire exclusion as the dominant anthropogenic disturbance on the landscape. Due to afforestation and in-growth of primarily fire intolerant trees

there is relatively high conifer stocking creating high connectivity of both ladder and crown fuels. Approximately 16 percent of the analysis area is indicative of FRCC 2-3 with a relatively high crown fire potential. (GIS imagery 2004). Within this area approximately 60 percent of the stands surveyed have a medium to high crown fire risk.

Effects of Fuels Treatments on the Residual Overstory

Under this alternative no fuels treatments would occur and no mortality would occur as a result of either mechanical fuel reduction or prescribed fire treatments.

Effect on Firefighter and Public Safety

Under the no action alternative, fuels accumulations would continue to shift away from grass, brush and hardwoods (Fuel Model [FM] 2/5/9) to a condition favoring high levels of coarse woody debris, litter, duff and ladder fuels (FM 10). During a wildfire event, higher fuel loads and crown fire hazards would increase fire suppression costs and the associated risks to both firefighters and the public.

Direct and Indirect Effects of Alternative B

From a fire/fuels standpoint, maintaining access for emergency vehicles into this area while providing ingress/egress for the public is essential. Both Options 1 and 2 provide for that critical access. In the short-term there may be some minimal fuel-loading concerns from activity-generated fuel concentrations in Option 1, but these should be short-lived, since any fuel concentrations would be mitigated in a timely manner.

Alternative B proposes both mechanical and prescribed fire treatments. Up to 4,970 acres are proposed for commercial harvest. In order to treat the fuel loading after harvest a variety of methods may be used to include up to 1,330 acres of jackpot/ under burning, and up to 2,388 acres of mechanical fuels treatments such as mastication, grapple piling and whip felling. This proposal also includes potential biomass removal and/or treatment of surface fuels in excess of R-6 down-woody requirements, (Eastside Screens 1994). Biomass removal would utilize slash piled at landings, or slash within the harvest units that could also be moved with a forwarder machine to the landing for processing into wood chips, hog fuel, or removed as firewood. Biomass would consist of such material as smaller diameter conifers, slash, and pulp logs. Approximately 203 landing piles would be created by this alternative. Some roads may be temporarily opened to facilitate firewood cutting. This would improve forest health, and help reduce hazardous fuels.

In general, units prescribed for jackpot burning contain a high percentage of fire tolerant residual trees such as western larch, ponderosa pine and Douglas-fir while units prescribed for mechanical slash treatments contain a high percentage of residual fire intolerant species such as lodgepole pine, western red cedar, western hemlock and grand fir. Prescribed fire might not be used in harvest units that consist of predominantly shade-tolerant trees or small diameter stands, where the overstory tree morality would be expected to exceed 10 percent. Additional snags may be created with the use of prescribed fire.

There are also 663 acres located outside of the harvest unit boundaries that have been identified as potential hazardous fuel reduction areas. Treatments may include hazardous fuels reduction by the use of jackpot and/or under-burning. Within these pre-identified areas, there are many silvicultural stands that are scheduled to receive pre-commercial thinning through mechanical means. Approximately 457 acres of pre-commercial thinning have been identified. There may also be areas that have been pre-identified as wildlife areas of concern such as wildlife travel

corridors; or other areas to protect such as archaeological heritage sites, meadows, and riparian areas.

Effect on Fire Regime Condition Class (FRCC)

Jackpot and/or under burning are proposed for up to 1,993 acres. Of the acres proposed to burn, many units contain residual trees that may be fire intolerant and may need mechanical treatment instead.

In skyline units that are not being proposed for jackpot and/or broadcast burning, nor any mechanical treatments, an effective fuels treatment alternative would be to whole tree yard material to landing piles, in order to reduce the fuel loading within the unit post-harvest.

These treatments, along with the silvicultural pre-commercial thinning are expected to reduce surface and ladder fuels biomass within the drier stand types and (at the landscape scale) should move FRCC 2 and 3 stands toward the FRCC 1 target. Subsequent conifer regeneration should also shift to a more fire tolerant cohort.

Effects of Fuels Treatments on the Residual Overstory

Fuels reduction through burning should result in a more open overstory and subsequent understory composed of a greater diversity of hardwoods, shrubs, forbs and grasses. Overall, this should improve forage quality for wildlife, minimize shade tolerant encroachment, and promote a more fire tolerant overstory. Historically, wildfires burned on the drier sites every 15-20 years, in patches ranging from 200–500 acres in size (Schellhaas 2000). With 70-80 years of fire exclusion, it may require several mechanical and/or prescribed fire treatments to successfully restore this area to its historic FRCC.

Effect on Firefighter and Public Safety

Roads provide relatively quick ingress/egress for firefighters, the public and medical personnel. Although driving in itself is a potentially hazardous activity, the benefits of vehicle access far outweigh the hazards associated with this activity. Roads are frequently used to anchor control lines on wildfires. Wildfires within un-roaded areas are usually more expensive and logistically difficult to suppress. Road systems allow making evacuation plans simpler during wildfire situations. Maintaining vehicle access for firefighting personnel is critical. This can be accomplished by the installation and maintenance of gates as effective closures.

Roads also provide access and are used to both partition and isolate treatment units. Units that lack adequate road access are usually more expensive and logistically difficult to treat. In this alternative, there may be culverts that are pulled and roads that are closed before all of the fuels treatments are complete. This probably would not be an issue as long as the units are located no further than one mile from a drivable road.

Cumulative Effects

There are no logical spatial units to consider as there often are with watershed assessments. Fire boundaries are not confined to watersheds or management units, as recent mega fires, such as the 2002 Biscuit fire, the 2003 Southern California fires, and the 2002 Hayman fire attest. Ignitions and fuel conditions many miles away from an area of concern may affect an area's risk of experiencing wildfire. To add further complexity, strategically placed (or misplaced) fuels treatments may have an effect greater than that of treatments placed at other locations due to the way that fire spreads. The cumulative effects of these projects are therefore site-dependent, and

knowledge of how processes of concern operate within a landscape is just as important as defining an appropriate spatial scale for analysis.

The temporal limits of a cumulative effects analysis can also be challenging. Short-term characterizations of risk typically discount rare events (Ziemer 1994), but such events may happen at any time and these events may play a vital part in the dynamics of aquatic and terrestrial systems. Discounting rare events is more risky when conducting long-term assessments because rare events are more likely to occur. Short-term assessments need not discount rare events either, as events of all possible magnitudes, durations or frequencies can be included in a probabilistic cumulative effects model. Such a model transparently reveals the consequences of a rare event occurring, in addition to its likelihood.

The importance of performing risk or cumulative effects assessments within an appropriate time frame is suggested by historical changes in fire risk. The background risk of wildfire in a given forest is often described using historical data. Both the portion of the record used and the duration of the period considered affect calculations of wildfire risk. Forest managers of the mid-20th century experienced a low risk of fire due to fire suppression effectiveness and the wetter climate of the 1940s and 1960s. Wildfires were likely to recur only a few times per millennium at most. Due to recent large wildfires, the fire rotation has increased to two wildfires per century. This difference in risk has profound implications for forest management because on most sites, it takes more than a half century for plantation trees to mature to harvestable size or to provide viable wildlife habitat. Moreover, these wildfires often burn with greater severity than did the short-interval fires of the past (Weatherspoon and Skinner 1995). In this example, the 90-year record may provide a less accurate characterization of future fire risk than that of the last few decades. (Comparative Risk Assessment Framework and Tools 2014).

Projects proposed or occurring on other ownerships as well as other National Forest System projects were considered during this analysis. Harvest activities on other ownerships follow Washington State guidelines and have resulted in more open stand conditions with reduced fuel loads. Other activities such as the Tiger Hill Grazing allotment do not change the effects displayed previously in this section.

Structure Risk and Effect on State, County, and Private Ownerships within the Renshaw Planning Area

Home and structure risk to potential wildfire is largely dependent on the following: 1. flammability of building materials; 2. adjacent wildland fuels; and 3. firebrands.

1. ***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). Choice of building materials for privately-owned structures is beyond the scopes of this analysis.

2. ***Adjacent wildland fuels:*** Wildland fuels on adjacent private ownerships include relatively open stands of immature ponderosa pine and Douglas-fir (FM 2, 5 and 9), closed stands of mature lodgepole pine, grand-fir, western larch, Douglas-fir and western red cedar (FM 8 and 10), and open stands of immature Douglas-fir and lodgepole pine with light to moderate logging slash (FM 11 and 12 respectively). 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). Fuel reduction treatments proposed for this project are designed to reduce the threat of severe surface and crown fire on NFS lands, which in turn should reduce the threat of severe surface and/or crown fires on

adjacent private ownerships. Nevertheless, unless similar treatments are initiated and maintained on adjacent wildland ownerships, proposed fuel reduction treatments on NFS ownerships should have little effect reducing the threat of a severe surface and/or crown fire on private ownerships within the study area.

3. ***Firebrands:*** 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). Proposed surface, ladder and crown fuel reduction treatments on NFS ownerships should reduce this potential threat, particularly on those areas that are within ½ mile of proposed treatment units.

Fuel reduction treatments proposed for this project are designed to reduce the threat of severe surface and crown fire on NFS lands, which in turn should reduce the threat of severe surface and/or crown fires on adjacent private ownerships. Nevertheless, unless similar treatments are initiated and maintained on adjacent wildland ownerships, proposed fuel reduction treatments on NFS ownerships would have little effect reducing the threat of a severe surface and/or crown fire on private ownerships within the analysis area.

Based on implementation of design criteria listed in chapter 2 Alternative B would meet Forest Plan direction for fire and fuels management.

Hydrology *(Key Issue 2)*

Information provided in this Environmental Assessment about hydrology is excerpted from the Renshaw Hydrology Report by Hydrologist Rob Lawler (July 2014). The full report is available in the project analysis files.

The Renshaw project area is primarily located within the Lost and Maitlen Creek HUC12[10] subwatersheds. The Maitlen Creek subwatershed is divided by the Pend Oreille River and for the purpose of this project calculations and analysis were performed for the portion of the subwatershed located west of the Pend Oreille River. The Lost Creek subwatershed is about 19,685 acres with approximately 91 miles of streams predominantly oriented northeast-southwest. The Maitlen Creek subwatershed is about 11,650 acres with approximately 50 miles of streams (excluding Pend Oreille River) predominantly oriented east-west. The subwatersheds range in elevation from just over 5,200 feet on Granite Peak and Seldom Seen Mountain down to about 2,000 feet at the Pend Oreille River. Approximately 300 acres of the project area are located at the upper edges of the Big Muddy Creek subwatershed. Since these acres represent less than 2 percent of the subwatershed area and the two mapped first order streams (< 0.5 miles of stream) are excluded from the harvest units, no further analysis was performed on the Big Muddy Creek subwatershed.

Based on the literature and field observations, the water quality analysis for this project will focus on sediment, temperature, and bacteria as the parameters most likely to be affected by proposed management activities for the Lost Creek and Maitlen Creek subwatersheds.

[10] Hydrologic Unit Code (HUC) is a hierarchical watershed delineation system developed by the U.S. Geological Survey where the number of digits represents the size and/or category (e.g. Lost Creek 170102160206 – HUC 12 – subwatershed). A more complete description of HUCs may be found at: http://water.usgs.gov/GIS/huc.html

Analysis Methods

The subwatershed analysis relied on data from field surveys, district fisheries and hydrology files, historical records, aerial photographs, geographic information systems (GIS) analysis, published scientific literature, and the Department of Ecology (DoE) Studies.

Effects of activities on subwatershed resources were assessed with respect to subwatershed condition, water quality (sediment levels, thermal modifications, etc.) and designated uses, water yield and peak flows, and stream channel conditions. Throughout the analysis, areas were calculated using ArcGIS and were rounded to the nearest acre, which may result in slight discrepancies between resource analysis numbers.

Rosgen Stream Classification

There are several stream types within the analysis area; the primary channels have been classified and that data is located in the project file. The Rosgen methodology (Rosgen 1996) is based on field measurement of physical stream parameters such as slope, sinuosity, valley confinement, substrate size distribution, and floodplain width. Most of the streams within the Lost and Maitlen (west) Creek subwatersheds are classified as B Rosgen Channels. B stream types have more gentle gradients, typically between two and four percent, and approaches to a floodplain are moderately sinuous. B streams typically carry sediment throughout the period of high flow and deposit it during low flows. According to Rosgen (1996), the B channel type is considered relatively stable and relies upon large woody debris and rock for that stability.

There are a limited number of C channel types within the analysis area, which are the pool-riffle streams that meander, are of low gradient, and are common in wide valleys. The upper reaches of Diamond Creek are an example of C channel within the analysis area. C channel forms are susceptible to shifts both laterally and vertically in response to changes in water and sediment yields. However, well-vegetated riparian zones adjacent to C channel types reduce adverse impacts of water and sediment yields.

The E channels have low to moderate sinuosity, gentle to moderately steep channel gradients and very low channel width to depth ratios. Generally this channel form is extremely stable unless the channel banks are disturbed and there are substantial changes in sediment and water yields. An example of this type of reach is found predominantly in the upper reaches of Lost Creek and headwaters of South Fork Lost Creek.

The F channels are entrenched streams with moderate sinuosity, very high width/depth ratios, and gentle to moderately steep channel gradients. These channels can develop high erosion rates as well as provide for very high sediment supply and storage capacities. An example of this type of reach is found in the middle reaches of Lost and South Fork Lost Creek.

Affected Environment

Watershed Condition

The stream types for Lost, South Fork Lost, and Renshaw Creeks range from the relatively low gradient channel in the valley bottoms to moderately steep in the headwaters. The annual hydrograph for streams in this region are dominated by spring run-off.

The main stream channels are predominantly Rosgen (1996) B and E type channels. Many of the reaches meander through meadows throughout the Maitlen Creek (west) and upper portions of the Lost Creek subwatersheds where currently impacts to reaches may be due to cattle grazing (Tiger

Hill Allotment), roads within the RHCA, and to a marginal extent by dispersed camping activity (2011-2013field observations). Old homestead meadows within the riparian habitat conservation area (RHCA) are lacking in woody and herbaceous riparian vegetation. Stream reaches of Lost Creek above Nile Lake are also adversely affected by the Rocky Creek County Road (C4699), which is located predominantly within the 300 ft. RHCA of Lost Creek and a fish bearing headwater tributary (about 4.5 miles of the 5 miles located within the Lost Creek subwatershed) and crosses Lost Creek at four separate locations. Unstable stream banks are present and width-depth ratios are mostly consistent for this upper portion of Lost Creek. The stream reaches, which are relatively stable but have localized areas that deviate from properly functioning conditions (i.e. over widen channels and streambank stability), are predominantly found in meadow areas (professional field observations 2011-2013, Hydrologist, Lawler). The portion of the Lost Creek subwatershed downstream of Nile Lake is relatively unroaded.

The three stream reaches with a TMDL impairment for temperature within the forest boundary are located in the Lost Creek subwatershed. Two reaches with TMDL impairments for temperature and/or Fecal Coliform are located downstream of the forest boundary where Lost Creek and South Fork Lost Creek flow into the Pend Oreille River.

Within the Maitlen Creek (west) subwatershed, the Forest Service land is relatively unroaded and there are no listed TMDL impairments. A portion of the Tiger Hill allotment is located within this watershed and localized impacts from cattle grazing and dispersed camping are evident (field observations 2011-2013, Lawler). A portion of the Hanks-Butte County road (C2685) is located within this watershed and crosses first order reaches of Renshaw Creek and a headwater tributary to Diamond Creek high up in the watershed.

Water Quality

Hydrologic Function - Road Density

The streams and roads within the analysis area are relatively stable. It was revealed in the field surveys that any damage to the streams was largely done at the time of construction. Since the 1980s, very little new road construction has occurred in the analysis area.

In the Lost Creek subwatershed, the hydrologic features identified included 4 log culverts of which three are located on open Forest Service roads, about 46 stream crossings with a metal culvert, 15 road/stream crossings with no structure, 5 areas that had saturated (wet) road segments, and 72 culverts for ditch drainage relief. Of the 150 identified points, six of the stream crossings with culverts are considered to be functioning at risk, not properly functioning (high failure potential or currently failing), or fish passage barrier points.

In the Maitlen Creek (west) subwatershed, the hydrologic features identified included 1 log culvert (on closed Forest Service road), about 13 stream crossings with a metal culvert, zero road/stream crossings with no structure, and 24 culverts for ditch drainage relief. Of the 40 identified points, two of the stream crossings with culverts are considered to be functioning at risk.

Currently, about 12 miles of roads are within RHCAs. Of the 12 miles, about five miles are Forest Service roads and seven miles are county/state roads with Rocky Creek County Road claiming nearly five miles. Limited segments are open (level 2 high clearance) and drivable (approximately 3.5 miles). The remainder is not technically hydrologically stable, but rather restricted or impassable (approximately 1.5 miles).

The following table is a summary of measures related to these existing conditions. All conditions are stated on a subwatershed basis including areas outside of the analysis area. The intent of the subwatershed road and stream condition table is not to arrive at an overall rating of good, fair, poor, but rather to try and paint a general picture of the subwatershed based on these factors. In fact, assigning a rating to some indicators such as road density and number of road/stream crossings is subjective since there are no Forest standards in place and the research is inconclusive.

Table 8. Summary of Existing Subwatershed Road and Stream Conditions (estimated) in the Renshaw Analysis Area

Watershed	Land Owner	Road miles*	Subwatershed Area (mi^2)	Road Density (mi/mi^2)	Stream Crossings**
Lost Creek	FS	45	31.3	1.4	52
	Non FS	8		0.3	12
	Total	53		1.7	64
Maitlen Creek (west)	FS	16	18.1	0.9	11
	Non FS	22		1.2	29
	Total	38		2.1	40

* Approximate value based on 2012 GIS road layer of open, closed, and private roads – only partial road records available for private land.

** Approximate value based on GIS layers of roads and streams.

Portions of a few of the analysis area roads are located adjacent to streams and contribute sediments either directly at stream crossings or indirectly from upslope cutbanks, fillslopes, ditches, and cross-drain relief culverts. Many of these road/stream crossings provide watering access for cattle and wildlife.

The roads in the Lost and Maitlen Creek subwatersheds tend to be concentrated in the north-eastern portion of the analysis area and east of Lost Creek in the southern portion. Slopes are predominantly moderate to low gradient. Overall, the roads within the Lost Creek and Maitlen Creek (west) subwatersheds are having minimal hydrologic impact.

Field surveys within the project area documented that sediment delivery from most of the roads is minimal with the greatest impact coming from Rocky Creek County Road (C4699). The sixty stream surveys conducted within the analysis area in 2009 provide an indication to the geomorphologic condition of the area streams and the overall condition of the subwatershed. The surveys were conducted on the main channels (Lost, South Fork Lost, Renshaw, and Diamond Creeks) and their tributaries. Surveys identified Rosgen (1996) stream types B, C, E, and F in the subwatersheds. Channel morphology conditions generally rated good or fair.

In the main stream channels, sediment sources from naturally occurring mass failures were very rare. Review of the analysis area (Lost Creek and Maitlen Creek subwatersheds) did not identify any major point sources (i.e. failed culverts, mass failures) of sediment on lands managed by the National Forests.

Stream temperature

Vegetation acts as a parasol for streams; shading them from the sun and keeping water temperatures cool. Five reaches within the Lost and Maitlen Creek subwatersheds are listed as temperature impaired) in the Washington Department of Ecology water quality 305b report (2008). This report has various levels of concern from “attaining state standards” to “impaired waters without a TMDL” (303d list). Of the five temperature impaired reaches, three are not on the 303d list since they are included in an approved TMDL implementation plan. Two of these are located in Lost Creek and one is located in the tributary that flows through Brown’s Lake. The temperature impaired stream reach that flows through Nile Lake is an area that has had some impacts from cattle and beaver. The reach is characterized by a wide floodplain with beaver ponds and braided channels resulting in poor riparian vegetation conditions, which are necessary for proper stream shading. The temperature impaired stream reach located in Lost Creek below Nile Lake has also been influenced by substantial beaver activity resulting in multiple beaver ponds, potentially raising water temperatures. The two stream reaches that are on the 303d list are located outside of the Forest boundary at the mouth of Lost Creek and South Fork Lost Creek at the confluence of the two streams with the Pend Oreille River. A stream reach in Upper Lost Creek is also identified for attaining state standards for water temperature.

In Maitlen Creek (west) subwatershed, the Lost Creek and South Fork Lost Creek temperature impaired waters as well as two reaches of the Pend Oreille River are identified in the WADoE 305b report. No other temperature-impaired waters are identified west of the Pend Oreille River in this subwatershed.

Water temperatures have been monitored in Lost Creek at the Forest Boundary and at Nile Lake from 2003 to 2010. Water temperatures collected at the inlet of Nile Lake in Lost Creek have consistently exceeded Washington state standards by five to six degrees similar to those shown for 2010. The seven-day average maximum temperature for this location in 2010 was 18˚C. Water temperatures collected at the Forest boundary in Lost Creek have consistently exceeded Washington state standards by five to seven degrees similarly to those shown for 2010. The seven-day average maximum temperature for this location in 2010 was 21.7˚C.

These data sets suggest that the temperature impairment in Lost Creek may be in response to the lack of healthy riparian vegetation and possibly natural conditions from a meadow and lake environment, or a combination of both.

Unique Wetlands

Wetlands throughout the area moderate high flows, act as water sources during periods of low stream flow and drought, recharge basin aquifers, and provide valuable aquatic refugia and habitat for fish and other aquatic life forms. The most prominent wetlands in the Lost Creek subwatershed are Tiger Meadows, Stuart Meadows, Rufus Meadows, and Granite Meadows. In the Maitlen Creek (west) subwatershed is Rabbit Ears Meadow. Numerous smaller wetlands are found throughout the subwatersheds. Many of the wetlands in the analysis area were homesteaded and cultivated in the early 1900s.

Effects Analysis

Direct impacts to the Lost and Maitlen Creek subwatersheds have occurred as a result of past harvest, historic fires, prescribed burning, homesteading, grazing, road construction, firewood cutting, and recreation (e.g. dispersed camping, off-highway vehicle use). The impact of these diverse activities has varied in both context and intensity. Based on formal and informal surveys along with existing data, the riparian areas within the subwatershed have been determined to be in fair to good condition.

The condition of riparian areas on private land is unknown within this subwatershed. Further data collection and analysis would need to be conducted at the subwatershed level before landscape level trends and recommendations could be made. Data needs include an intensive water quality sampling at a higher frequency level as well as riparian surveys of perennial and intermittent streams, seeps, springs, and wetlands within the subwatersheds.

Direct and Indirect Effects of Alternative A

Lost and Maitlen Creek Subwatersheds

The effects of the No Action alternative are based on continuation of current management on National Forest System Lands in the project area. Recent past, current, and reasonably foreseeable actions on other ownership within the subwatershed would continue to have the same effect as described under cumulative effects. Natural ecosystem processes would continue. There would be no direct effects to the subwatershed hydrology since no roads would be constructed nor decommissioned and there would be no implementation of the proposed timber harvest or prescribed fire on National Forest System Lands in the project area. Indirectly, this could have an adverse effect on the subwatershed when compared to the proposed action alternative. For example, those roads that have been identified for decommissioning would not be decommissioned and stream crossings proposed for restoration would continue to have an adverse cumulative subwatershed effect. This would result in an increased potential for higher levels of sediment delivery and elevated stream temperatures to the stream network in the subwatershed.

Watershed Condition

Water Quality

Road Density, Sediment, and Stream Temperature

The subwatershed condition would not be expected to improve. None of the proposed road improvements or forest health treatments would occur. In the event of a stand replacing wildfire, increases in water temperature, sediment, peak flows/water yield, and risk of road and culvert failures are expected, likely to adversely affect water quality. Associated restoration opportunities, such as road decommissioning, soil restoration, and stream crossing improvements, analyzed in this document, would also not occur. Without these improvements, the risk of a large scale failure remains elevated, especially during heavy precipitation, rain-on-snow, or speedier than normal snowmelt events which result in higher than normal runoff.

Direct and Indirect Effects of Alternative B – Lost Creek

These direct and indirect effects are based on the assumption that all recommended design criteria are implemented and operate effectively, and that regular maintenance would occur.

Watershed Condition

Water Quality

Road Density, Sediment, and Stream Temperature

Based on the results of field observations within the RHCA on other areas of the district, appropriate implementation of BMP and INFISH recommendations have resulted in minimal to no effects from timber harvest and prescribed burning.

Sedimentation to streams and wetlands would be the primary concern to water quality resulting from timber harvest, road construction, and prescribed burning under the proposed action alternative. Construction of new and temporary roads would have a small effect on sediment delivery to the stream network since the number of new or temporary stream crossings would be as many as six sites. Six crossing structures would be removed from the current Rocky Creek

Road prism through the obliteration process and four new crossing structures would be located within the proposed road location (Option 1). In option 2; the three bridges would be replaced and brought up to current standards. The effect of leaving the road in place would allow elevated sediment delivery to continue as the road is located within the RHCA. In some reaches the road edge is the stream bank, which restricts the streams ability to regulate itself due to lack of shade, vegetated bank stability, and flood plain. Roadside streams also receive elevated sediment delivery adversely impacting fish habitat and stream temperature. The replacement of the three bridges meeting current standards would minimally improve sediment delivery to Lost Creek. Relocating Rocky Creek road away from the RHCA would also have beneficial effects on the groundwater dependent wetlands in the area as well as groundwater flow connectivity in general. This is expected to have a beneficial effect on water temperatures as well.

The effect on water quality at all temporary stream crossings is expected to be short duration during installation and removal with channel restoration post-harvest.

Road prisms are the primary source for increased sedimentation to the area streams. The proposed action Option 1 would construct about 2.7 miles of new system road to relocate Rocky Creek Road, which would obliterate approximately the same amount of road. New road construction, which would include four stream crossings with culverts, is expected to have considerably less effect on the riparian function than the current Rocky Creek road due to the new location being predominantly upland.

About 10 miles of temporary road construction is proposed which would include at least one temporary stream crossing structure. The temporary crossing is expected to have minimal short-term effect on the riparian function in the subwatershed since temporary roads are expected to have all stream crossings removed, be obliterated, and restored to forest productivity post-harvest. Were these roads not obliterated and recontoured, an increase in road density from 1.7 mi/mi^2 to 2.0 mi/mi^2 would occur and an increase in adverse effects to the subwatershed would be expected. The benefit of fully obliterating temporary roads is increased vegetative productivity as well as properly functioning hillslope hydrology, which includes infiltration and natural shallow subsurface flow rather than overland flow causing elevated rate of erosion and higher risk of hillslope failure. The benefits would include the following: approximately 1 acre of riparian areas scattered among the templates would be restored. In addition, the roads would be placed in a hydrologically inert status. Cross drains and culverts would be removed and the areas designed to drain naturally. This would prevent water from ponding on the road and potentially causing a road failure that delivers sediment into the stream system. Road out-sloping would be used to drain the roads which would help to decrease any adverse effects using these temporary roads would have on fisheries due to sedimentation. By using these temporary roads and then having them grow back into a forest, there may be a small measureable short-term effect to the amount of sediment delivered to the stream reach. The biggest effect is the long term stability of the stream channels by reducing the chance of a road failure.

Reconstruction of about 23 miles of specified roads would vary in level of disturbance (light, moderate, or Heavy). Stream crossings on reconstructed closed roads would likely necessitate culvert replacements or installations in approximately twenty locations. These culvert replacements would likely have short-term impacts of increased sediment delivery, however appropriately sized replacement culverts would provide for long-term reduction in sediment inputs to the stream network. Rock needed for road construction or reconstruction would come from one of five pits; Seldom Seen, Little Brown’s Lake, Hande, Thomas Mountain Quarry, or Rocky Creek.

Roads are known to collect and concentrate overland runoff, increasing erosion rates and potential for road failures. Closed roads reopened to facilitate harvest are expected to have all culverts removed and entrances bermed post-harvest. Provided project BMPs are appropriately implemented, the overall effect from reopening closed roads is expected to be minimal with some short-term effects to be expected. Closing these roads with hydrologic stabilization is expected to have increased long-term beneficial effects.

Approximately five miles of system roads are proposed for decommissioning in Option 1. These roads may include up to ten culvert removals, returning stream conditions to a natural condition. These roads would be expected to be fully obliterated and restored to full forest productivity and processes. These restoration efforts would likely have a short-term impact from increased sedimentation. Long-term impacts are expected to include an overall decrease in sedimentation to the stream network due to a reduction in concentrated overland runoff and improved infiltration rates and shallow groundwater flow. In Option 2, only about 2 miles would be decommissioned.

The largest positive hydrological effect on the stream network would be from the obliteration of about 2.2 miles of Rocky Creek Road (Option 1), which is predominantly located in the RHCA of Lost Creek. Rocky Creek Road is located in low gradient terrain and maintenance is influenced by shallow groundwater zone. To facilitate the obliteration of this portion of the Rocky Creek Road, a new route would be constructed to the north in more suitable terrain, improving drainage and mitigating aquatic resource concerns.

The obliteration would include re-establishing flood plain, removing three outdated bridge structures on Lost Creek, and recontouring/decompaction of road prism within the RHCA. Short duration adverse effects to hydrology from this project may occur from the road obliteration, flood plain restoration, and riparian restoration. The long-term effects would be positive with reduced sediment inputs from streamside road and increased shading where riparian areas are restored to more natural condition. The new road location would cross three perennial streams and two ephemeral systems, but would not parallel the streams. The location of the new road would be expected to have a substantial decrease in sediment delivery to the stream network and would be expected to contribute to a decrease in stream temperatures in Lost Creek.

Existing unauthorized trails and stream crossings created from OHV use in this subwatershed are minimal. The effects from these unauthorized trails and stream crossings are often detrimental to water quality due to lack of design and drainage control. Design criteria and BMPs are expected to discourage further unauthorized trail development in harvest units and not increase impacts to water quality.

Stream Temperature

Stream temperatures may be affected by removal of the shade canopy through timber harvest, prescribed fire, and road construction within riparian zones. Limited timber harvest and prescribed burning are proposed in the RHCA, for the purpose of improving forest health and reducing fire hazard risk within the RHCA. Road construction/reconstruction is expected to be the dominant source of temperature changes to area streams. Road corridors are narrow and the limited number of openings created at these locations would have minimal and unmeasurable effect on shade within the RHCA.

Water Yield/Riparian Function

Water yield is known to be influenced by a reduction in vegetation, although shrub and forbs growth usually dampens this effect within a relatively short time, typically within one to two

growing seasons. The stream channels in this subwatershed have been formed by natural stand replacing events throughout time. The effects to water yield and peak flows are expected to be unmeasurable and to mimic natural changes to the forest environment.

Recent literature addresses the effects of forest practices on peak flows and the consequent channel response in western Oregon (Grant et al, 2008). Grant et al. synthesizes the findings of an extensive array of existing literature linking forest practices in the Pacific Northwest with changes to peak flow. For basins within the transitional zone, Grant et al. (2008) found that the detection threshold for changes in peak flows occurs at 20 percent of watershed area harvested. Thus, changes in peak flows cannot be detected at harvest levels of less than 20 percent (Grant et al 2008).

Approximately 3,600 acres (~18 percent) of the Lost Creek subwatershed are proposed for commercial treatment, 300 acres (~1.5 percent) for pre-commercial thin, and 435 acres (~2.2 percent) for under burn. Typically, during pre-sale layout, the project treatment acres are reduced by 20-30 percent due to sensitive areas that are removed from the units (personal communication with zone TMA, Eric Trimble).

Cumulative Effects

From the early 1900s, past actions at the Lost Creek subwatershed scale include homesteading, grazing, timber harvest, road construction, fire wood cutting, and recreation. Timber harvest and associated road/skid trail construction occurred within the riparian area in the past. Mixed effects result from timber harvest; negative in that stream access for cattle and recreation is often enhanced and positive in that healthier stands are produced which are less susceptible to large scale events of fire, insect, and disease.

Vegetation management within the Lost Creek subwatershed since 1969 includes approximately 600 acres (~3 percent) of WADNR land and approximately 880 acres (~4.4 percent) of National Forest Service land (Brown's Lake project). Foreseeable future vegetation management activities within the subwatershed include the Timber Mountain project on National Forest Service land with approximately 1210 acres (~6 percent) proposed treated. The portion of the Timber Mountain project located within the Lost Creek subwatershed is expected to be limited to the South Fork Lost Creek catchment (~5780 acres) south of the Renshaw project. The surface and shallow groundwater hydrology of the South Fork Lost Creek and Lost Creek catchments function independently; hence, cumulative effects would be limited to the individual catchments.

Dispersed camping has predominantly been located along the lower stream reaches where there are wide flood plains and homestead meadows. Without specific boundaries, the amount of ground impacted over time at dispersed sites tends to increase. Many of the dispersed camp sites have become OHV "launch" points as OHV vehicle use has become a popular camping and recreation activity. User created OHV trails typically do not have controlled drainage and often create undesired hydrologic connectivity to the stream network, which often contributes to increased sediment delivery. OHV use within the Lost Creek subwatershed is low and has resulted in minimal adverse impacts.

Other Present and reasonably foreseeable future actions on National Forest System (NFS) land include: developed groomed snowmobile route and the Tiger Hill Range Allotment.

The Tiger Hill Range Allotment grazing practices are predominantly a season-long system over the whole allotment. No change is expected in the foreseeable future.

Other recent, current, or foreseeable future activities within or near the analysis area include Pend Oreille County road maintenance and improvements, private road improvements, Washington Department of Natural Resources (WADNR) road abandonment, road construction, and culvert installation (EA appendix A) . The road maintenance, abandonment, and improvement activities are expected to have minimal short term impact to the hydrology as best management practices and mitigation requirements are in place per Washington State Forest Practices are expected to be followed.

Direct and Indirect Effects of Alternative B – Maitlen Creek

These direct and indirect effects are based on the assumption that all recommended design criteria are implemented and operate effectively, and that regular maintenance would occur.

WATERSHED CONDITIONS

Water Quality

Road Density, Sediment, and Stream Temperature

Based on the results of field observations within the RHCA on other areas of the district, appropriate implementation of BMP and INFISH recommendations have resulted in minimal to no effects from timber harvest and prescribed burning.

Sedimentation to streams and wetlands would be the primary effect to water quality resulting from timber harvest, road construction, and prescribed burning under the proposed action alternative. Construction of new and temporary roads would have a small effect on sediment delivery to the stream network since the number of new or temporary stream crossings would be no more than three sites. This effect is expected to be short duration at all temporary stream crossings with removal of crossings, channel restoration to mimic pre-disturbance condition, and full obliteration of temp road post-harvest. No new road construction is proposed.

Road prisms are the primary source for increased sedimentation to the area streams. No new system roads are proposed in the Maitlen Creek (west) subwatershed.

About two miles of new temporary road construction are proposed which would include up to two temporary ephemeral stream crossing structures. These temporary crossings are expected to have minimal short term effect on the riparian function in the subwatershed as temporary roads are expected be fully obliterated and restored to full forest productivity post-harvest.

Reconstruction of about 12 miles of specified roads would vary in level of disturbance (light, moderate, or Heavy). Stream crossings on reconstructed closed roads would likely necessitate culvert replacements or installations at one or more locations. These culvert replacements would likely have short-term impacts of increased sediment delivery, however appropriately sized replacement culverts would provide for long-term reduction in sediment inputs to the stream network. Rock needed for road construction or reconstruction would come from one of five pits; Seldom Seen, Little Brown’s Lake, Hande, Thomas Mountain Quarry, or Rocky Creek.

Roads are known to collect and concentrate overland runoff, increasing erosion rates and potential for road failures. Closed roads reopened to facilitate harvest are expected to have all culverts removed and entrances bermed post-harvest. Provided project BMPs are appropriately implemented, the overall effect from reopening closed roads is expected to be minimal with some short-term effects to be expected. Closing these roads with hydrologic stabilization is expected to have increased long-term beneficial effects.

Decommissioning of approximately one mile of system roads is proposed in the Maitlen Creek (west) subwatershed. No stream crossings are located on these roads. Where these roads are fully obliterated, infiltration and shallow groundwater flows are expected to improve with a forest productivity regime consistent with pre-disturbance conditions.

Existing unauthorized trails and stream crossings created from OHV use in this subwatershed are minimal. The effects from these unauthorized trails and stream crossings are often detrimental to water quality due to lack of design and drainage control. The potential for further unauthorized trail development in newly harvested units is expected to be mitigated by implementation of BMPs.

Stream Temperature

Stream temperatures may be affected by removal of the shade canopy through timber harvest, prescribed fire, and road construction within riparian zones. Limited timber harvest and prescribing burning are proposed in riparian zones, for the purpose of improving forest health and reducing fire hazard risk within the RHCA. Road construction/reconstruction is expected to be the only source of temperature changes to area streams. Road corridors are narrow and the limited number of openings created at these locations would have minimal effect on riparian shade. No measurable change to the streams is expected to occur.

Water Yield/Riparian Function

Water yield is known to be influenced by a reduction in vegetation, although shrub and forb growth usually dampens this effect within a relatively short time, typically within one to two growing seasons. The stream channels in this subwatershed have been formed by natural stand replacing events throughout time. The effects to water yield and peak flows are expected to be unmeasurable and to mimic natural changes to the forest environment.

Recent literature addresses the effects of forest practices on peak flows and the consequent channel response in western Oregon (Grant et al, 2008). Grant et al. synthesizes the findings of an extensive array of existing literature linking forest practices in the Pacific Northwest with changes to peak flow. For basins within the transitional zone, Grant et al. (2008) found that the detection threshold for changes in peak flows occurs at 20 percent of watershed area harvested. Thus, changes in peak flows cannot be detected at harvest levels of less than 20 percent (Grant et al 2008).

Approximately 1370 acres (~12 percent) of the Maitlen Creek (west) subwatershed are proposed for commercial treatment, 160 acres (~1.5 percent) for pre-commercial thin, and 230 acres (~2 percent) for under burn. Typically, during pre-sale layout, the project treatment acres are reduced by 20-30 percent due to sensitive areas that are removed from the units (personal communication with zone TMA, Eric Trimble).

Cumulative Effects

From the early 1900's, past actions at the Maitlen Creek (west) subwatershed scale include homesteading, grazing, timber harvest, road construction, fire wood cutting, and recreation. Timber harvest and associated road/skid trail construction occurred within the riparian area in the past. Mixed effects result from timber harvest; negative in that stream access for cattle and recreation is often enhanced and positive in that healthier stands are produced which are less susceptible to large scale events of fire, insect, and disease.

Vegetation management within the Maitlen Creek (west) subwatershed since 1969 includes approximately 100 acres (~1 percent) of private land and approximately 1280 acres (~11 percent) of National Forest Service land (Brown's Lake project). No additional foreseeable future vegetation management activities within the subwatershed are expected.

Dispersed camping is very limited in the Maitlen Creek (west) subwatershed and predominantly is located along the Hanks Butte road or near meadows.

Some harvest units have become attractive areas for the creation of unauthorized OHV trails which typically are not engineered or designed for appropriate hydrologic drainage. There is potential for an increase in unauthorized trails to occur where harvest units are located alongside roads and trails. Provided design requirements and specified BMPs are implemented correctly, it is expected new unauthorized trail opportunities would be minimal to none and an adverse impact would not occur.

Present and reasonably foreseeable future actions on National Forest System (NFS) land include: developed groomed snowmobile route and the Tiger Hill Range Allotment.

The Tiger Hill Range Allotment grazing practices are predominantly a season-long system over the whole allotment. No change is expected in the foreseeable future.

Other recent, current, or foreseeable future activities within or near the analysis area include Pend Oreille County road maintenance and improvements, private road improvements (see EA appendix A). The road maintenance, abandonment, and improvement activities are expected to have minimal short term impact to the hydrology as best management practices and mitigation requirements are in place per Washington State Forest Practices are expected to be followed.

Cumulative effects of the proposed action and past, current, and reasonably foreseeable actions on the Maitlen Creek subwatershed is expected to have an improving trend for water quality and the general aquatic environment provided design criteria and Best Management Practices are implemented.

The Forest Service is required by law to comply with state water quality standards developed under the Clean Water Act. All activities proposed under Alternative B, for Lost and Maitlen Creek Subwatersheds, would meet Forest Plan direction for water quality management provided design criteria and BMPs listed in chapter 2 are fully implemented.

Fisheries *(Key Issue 2)*

Information provided in this Environmental Assessment about fish is excerpted from the Renshaw Fisheries Report by Fisheries Biologist Karen Honeycutt and Biological Technician Meghan Lyons (July 2014). The full report is available in the project analysis files.

Westslope cutthroat trout (WSCT) is identified as a species of interest (SOI) due to its status as a state candidate species and Forest Service Region 6 sensitive species. Bull trout were listed as a Threatened Species in 1998 (63 FR 31647).

Affected Environment

Desired Future Conditions

The desired future condition for the aquatic and riparian ecosystem contains two parts. First, stream and riparian conditions fully support fish populations under normal climatic conditions.

Second, they are resilient when subjected to extreme climatic events and recover rapidly without irretrievable damage. These conditions are maintained by ensuring the present and future supply of ecosystem structural elements that control: a) landscape water storage and slow release functions (i.e. wetlands, floodplains, vegetative cover); b) channel form and function (i.e. riparian vegetation for streambank stability and large woody debris) by preserving the full diversity and function of wetlands, floodplains and riparian vegetation.

Desired Future Conditions are represented by the INFISH Riparian Management Objectives (RMO). The four RMOs: Water Temperature, Large Woody Debris, Width/Depth Ratio, and Pools Per Mile are used to assess health of the system and project the minimum needed for good habitat.

Table 9. Riparian Management Objectives

Habitat Feature	Interim Objective
Temperature	No measurable increase in maximum water temperature (the average of the maximum daily temperature of the warmest consecutive 7-day period measured on an annual basis). Maximum water temperatures below 15 Degrees C. within adult holding habitat and below 9 Degrees C. within spawning and rearing habitats.
Large Woody Debris	>20 pieces per mile; >12 inches diameter; >35 feet in length
Bankfull Width /Depth Ratio	bankfull width / maximum bankfull depth <13
Pools per mile	>56 for streams less than 20 feet wide

Watershed Existing Population Condition

The analysis area used to determine effects to fish habitat is the Lost Creek and Renshaw Creek watersheds. Limited historic information is available for the fish populations of Lost Creek and Renshaw Creek, the drainages within the analysis area. There is one natural blockage presently preventing fish passage between Box Canyon Reservoir and upper Lost Creek in this analysis area.

The analysis area contains two perennial, fish bearing creeks; Renshaw Creek and Lost Creek. These watersheds have been surveyed for the presence of fish and for physical habitat condition using the Hankin-Reeves survey protocol in 1991, 1994, 1999 and 2009.

Lost Creek supports eastern brook trout below Nile Lake. The portion of Lost Creek that lies upstream of Nile Lake supports eastern brook and rainbow trout. The brook trout population appears to be viable but the rainbow numbers are low and viability is questionable. Nile Lake has been stocked by the state since at least 1944. It presently is stocked with Kettle River rainbow trout but has been stocked with eastern brook and westslope cutthroat trout in the past. Brown's Lake has been stocked infrequently with eastern brook trout since 1962. The brook trout populations in both lakes have been reproducing naturally. Rainbow trout are planted every year in Nile Lake and show no indication of successful reproduction. In addition to salmonids, Lost Creek supports sculpin species and Nile Lake contains a viable pumpkinseed population.

Renshaw Creek contains a population of eastern brook trout that appears viable.

Connectivity

There is a waterfall on Lost Creek below Nile Lake. There are no known natural barriers to Renshaw Creek. Road crossings in the analysis area affect fish distribution.

County Rd 4699 prevents up stream fish passage at 4 crossings of tributaries to Lost Creek that may support seasonal spawning. There are 4 crossings on the main stem of Lost Creek. While they are bridges, they need to be evaluated for fish passage.

Forest Service Roads 9400500, 9400520 prevent up stream fish passage into tributaries to Lost Creek that may support seasonal spawning. Road 7018560 crosses a fish-bearing stream and limits migration.

Figure 6. Lost Creek waterfall below Nile Lake.

Rainbow trout and eastern brook trout populations below these barriers are not able to access approximately 2 miles of suitable spawning and refugia habitat upstream. The mainstem crossings limit migration and may cause population declines in areas of the stream.

Watershed Existing Habitat Condition

Lost Creek and Renshaw Creek are tributaries to the Box Canyon Reservoir/Pend Oreille River, which flows into the Columbia River. This watershed also contains natural lakes called Nile and Brown's Lakes.

In general the creeks provide good fish habitat. INFISH (Inland Native Fish Strategy) Riparian Management Objectives are being met for parts of the area. Both streams were surveyed in 2009 using the R6 Stream Survey protocol.

Nile Lake lacks large woody debris along its shoreline. The riparian vegetation is in good condition except near the boat launch and mouth of Lost Creek. No aquatic noxious weeds are present. Recreation use and cattle grazing may be factors in reduced conditions (professional field observations, Fisheries Biologist, Honeycutt, 2013). Water quality, densities of phyto- and zoo-plankton are within acceptable standards. Forest Service Roads 9400530 and 9400532 are the access roads for Nile Lake.

Lost Creek

Large Woody Debris (LWD)

Only four of the 11 reaches surveyed meet the INFISH RMO for LWD, these four are reaches 2, 3, 4, and 5. Low levels of LWD are most often related to those segments of streams that are near homestead meadows within the riparian area. Annual grazing and the periodic cutting of coniferous trees out of the meadows have eliminated a portion of any potential contributing source of instream wood. In addition, the increased access to the remaining riparian area to dispersed recreationists for many years has also reduced any contribution of instream wood. The lack of recruitment sources in these reaches is the reason there are low numbers of large woody debris in these two reaches.

Bankfull Width Depth (BFWD) Ratio

The width to depth ratio as described in INFISH is for wetted width depth. This has been changed for this analysis to bankfull width to depth (BFWD). The reason for this change is that it is easier to take repeated measurements of bankfull width to depth. The BFWD RMO has been set at 13 for this analysis. In previous analyses on Hankin and Reeves data across the Forest, a BFWD ratio below 13 was found to be indicative of good bank and channel stability. This is being met in all reaches except for reach 2 of Lost Creek, which has a BFWD of 46.

Lost Creek has 4 bridges crossing it. These bridges are old and need to be evaluated for hydrologic stability. They may be causing downstream impacts if they are too narrow. These impacts include substantial damage to the stream channel and fisheries due to failure during high flows.

Pools Per Mile (PPM)

The INFISH pools per mile RMO is not being met on any surveyed reach in the analysis area. However, it is more suitable to compare the pools per mile with the average for other managed watersheds. The “A Characterization of Inventoried Streams in the Columbia River Basin" (McKinney et. al.1996) lists the average pools per mile for managed watersheds in the Pend Oreille Subbasin. This data uses the pools per mile collected through the Hankin and Reeves Survey Method. This data gives a more appropriate indicator than the INFISH riparian management objectives. The average for streams that are between 10 and 25 feet wide in moderate gradient systems is 10 to 20 pools per mile. All of the surveyed reaches in the analysis area meet the 10 to 20 pools per mile average.

Water Temperature

Reaches 2, 4, and 5 of Lost Creek do not meet the water temperature standards. This is due primarily from the solar radiation warming of Nile and Brown’s Lake. Instream large woody debris numbers are low primarily due to past riparian harvest and the continued maintenance and use of existing livestock pastures. Historic and present increase in sediment over natural levels, as well as currently unstable, eroding streambanks, has widened certain segments of stream channels. This widening decreases water depth, which may, in turn, increase water temperatures during the summer months.

Embeddedness

The stream has embeddedness greater than 35 percent in the upper reaches above Nile Lake, with sand as the dominant substrate in both streambed and stream bank. Some of this is due to low gradient, sediment collecting segments of the stream, and inputs from the transportation system. Point sources for this sediment also come from bank sloughing due to sites being dominated by Kentucky bluegrass (from homesteading), cattle trampling of banks and grazing the riparian vegetation to the point that it can no longer hold the stream banks together. This is particularly true in the reach just above Nile Lake and within Stewart Meadows. The Lost Creek road also contributes sediment in a few places.

Forest Service roads 3140502 7018500, 7018502, 7018503, 7018505, 7018550, 7018560, 9400501, 9400520 have crossings or cut through riparian areas. The culverts are entry points for sedimentation. There may be culverts that are too small for the stream and are causing downcutting. All of these roads are in a portion of the riparian area. The 3140502 is in the RHCA of a non-fish bearing creek. The Lost Ruby Watershed analysis recommended improved road

drainage on the 7018500 along upper Lost Creek to eliminate direct deposit of sediment into stream.

Renshaw Creek

This stream has inadequate large woody debris for the lower 1.5 miles possibly due to some past flood event. Pool frequency throughout the stream is low. Width depth ratios are good. Temperatures are within requirements for adult holding habitat. Sand from Highway 20 washes into Renshaw Creek. County Rd. 2625, where it lies within the riparian area of Renshaw Creek, has eliminated a good portion of the riparian vegetation within its imprint.

Direct and Indirect Effects of Alternative A

Past timber harvesting has resulted in changes in forest cover. Timber harvest can increase total water yield, increase peak flows and decrease summer low flows. There are no historic or recent hydrographs available for the watershed within the analysis area so it is unclear the extent of any change in the flow regime. Recent timber harvest in riparian areas, on private lands, may have also increased water temperature through the removal of overhead riparian canopy and change in summer flows. Again, the data is not available to determine changes in water temperature related to past harvest.

However, as young trees mature and forest cover increases, any effects from past harvest are expected to decline. All even age harvest areas on NFS lands in the analysis area are in some stage of transitioning into fully functioning timber stands. The percentage of acreage of NFS lands in the analysis area in open condition has greatly decreased since the 1980s. This is due to the fact that most past even age harvest areas are now 15 to 25 year old stands with partial to full forest canopy closure and that current selective harvest and commercial thinning prescriptions do not create large openings. Barring unforeseen natural events such as wildfire, this trend is expected to continue.

Roads

Forest Service roads within the analysis area would continue to be maintained at slightly reduced levels in the future due to anticipated declining road maintenance budgets. Roads are one of the two main contributors of sediment to Lost Creek and Renshaw Creek. The greatest impact to fisheries is the Rocky Creek County Road (C4699). County Rd 4699 would continue to prevent up stream fish passage at four crossings of tributaries to Lost Creek. These tributaries could support seasonal spawning if access for fish was available. Forest Service Roads 9400500 and 9400520 prevent up stream fish passage into tributaries to Lost Creek. These tributaries could support seasonal spawning if access for fish was available. Road 7018560 crosses a fish-bearing stream and limits migration.

INFISH RMO Effects Summary

Large Woody Debris (LWD)

Large woody debris would remain below the INFISH LWD objective. The lodgepole stands along Lost Creek would not be treated. These stands will never attain diameters to meet the INFISH RMO for LWD. The Rocky Creek Road reduces the contributing area for LWD. Trees that fall on the road would continue to be cut for access. Cattle grazing on young trees prevent these trees from attaining the size meet the INFISH RMO for LWD. A large stand replacing fire however has the potential to add large amounts of LWD to a stream system. Beavers are very active in this watershed and will continue to build large dam systems.

Bankfull Width Depth (BFWD) Ratio

The bankfull width to depth (BFWD) is at risk from the road system. Eight of the stream crossings with culverts are considered to be functioning at risk, not properly functioning (high failure potential or currently failing), or fish passage barrier points. If a failure occurs, it could negatively affect BFWD ratios.

Pools per mile (PPM)

The INFISH pools per mile RMO as interpreted for this analysis would be reduced as pools fill from sedimentation over time.

Water Temperature

The Hydrology report discusses the temperature issues as it relates to State Water Quality standards. The prediction is that in the event of a wildfire, temperatures would increase. The temperature issues are not expected to be resolved with the No Action alternative.

Embeddedness

Sediment is expected to continue to impact Lost and Renshaw Creeks.

No Action Effects Summary

There is no irreversible and irretrievable commitment of aquatic resources under the "No Action" alternative. Suppression activities would be rehabilitated through BAER[11] and suppression rehabilitation efforts. Regardless of fires, roads would continue to be a dominant cause of habitat degradation especially the Rocky Creek Road. The fish populations, the fish habitat, and the INFISH RMOs would remain the status quo.

There are no significant effects to fisheries for the No Action alternative unless a stand-replacing fire occurred followed by a large storm event during the recovery period. Suppression activities may have short and long-term effects. Under a no fire scenario, the status quo would be maintained. Sediment would not reach levels detrimental to fisheries. Creeks would continue to provide an eastern brook trout, westslope cutthroat trout, and rainbow trout fisheries. Brook trout mature at a smaller size than rainbow trout or westslope cutthroat trout. If habitat becomes too degraded, it may not be able to support an adult rainbow or cutthroat trout, but may still support an adult brook trout population.

Direct and Indirect Effects of Alternative B

Road management, vegetation management, and fire management activities have the potential to affect Inland Native Fish and Fish Habitat. Activities within the riparian habitat conservation areas (RHCAs) are the main concern. The indicators that the activities are compared against are the INFISH RMOs of pieces of large woody debris per mile, bankfull width to depth ratios, pools per mile, and temperature.

Fuel Treatments

[11] Burned Area Emergency Rehabilitation

The proposed action reduces the risk of stand-replacing fire, and one of the major landscape processes in this watershed is fire. Because of past fire suppression efforts, fuel loadings in the watershed are high. This increases the risk of stand-replacing fire both in and adjacent to RHCAs. By reducing the risk, there is a possible beneficial effect to fisheries, INFISH RMOs, and fish habitat from the proposed action.

Prescribed fire allowed in the RHCAs would be designed to meet the INFISH Riparian Management standards and guidelines by using practices and actions that do not prevent attainment of Riparian Management Objectives and minimize disturbance of riparian ground cover and vegetation. The design criteria recognize the role of fire in ecosystem function and allow application in a manner that does not retard attainment of Riparian Management Objectives and avoids adverse impacts on inland native fish.

Fuel treatments (underburns) within the RHCA are beneficial to the RHCA because they prevent the complete loss of trees and vegetation from fire. To require fire to be excluded from RHCAs could necessitate additional building of fire lines, saw lines, and removal of vegetation. These actions have a greater potential to cause detrimental impacts to the attainment of the RMOs than allowing some fire use. The impacts can mostly be avoided by allowing backing fires to creep into them. Where the fire enters the RHCA, it would burn small woody debris and leave large down woody material intact. Conditions would be such that 90 percent of the duff would be retained, and no large trees would be killed.

The prescribed burns would not cause a detrimental impact to fisheries. The filtration capacity of the riparian forest floor would not decrease and treatments are not expected to impact flows. For these reasons, it is unlikely that noticeable increases in sediment influxes to streams would be caused by the fuel treatments. A research paper describes long-term sediment increases after spring prescribed burning on steep Idaho Batholith soils (Megahan et al. 1995), introducing some uncertainty about these projections. There are large differences between the Idaho landscape of that study and the analysis area, so that we would not expect similar response here. Nevertheless, the potential for prescribed fire to bare more soil than desired and to cause some increase in sediment production is recognized. This impact is short-term. Natural vegetative recovery is usually within the same season in riparian areas due to the high moisture levels. With regard to water quality, the burning of slash and burning to restore open ponderosa pine--Douglas-fir forest stands would result in nutrient flushes into streams. This would be likely to support rather than damage the fishery, but in any event would probably be too minor and transient to be a detrimental influence.

The suppressed stands, mainly lodgepole, along Renshaw and Lost Creeks would be treated. The goal is to have desirable stands that would contribute large woody debris to the streams. These sites would be managed to meet that goal.

The INFISH RMOs would be maintained or improved with these fuel treatments.

Vegetation Management

Since RHCAs can encompass a larger area than the actual riparian area, some commercial units and dry forest types are included in the RHCAs. Commercial harvest activities would mainly occur in the upland forest types. The three-zone strategy lays out the design criteria for treatments within RHCAs. For the commercial harvest units, there would be no effect to trout or INFISH RMOs from harvest activities within individual unit boundaries, except that the risk of stand-

replacing fire is reduced. This document incorporates by reference the effects analysis in INFISH for the effects of following the standard and guidelines.

Commercial Thinning

Commercial thinning is done in upland vegetation (non-riparian) portions of units to promote larger tree growth, and forest health, and to reduce the risk of a crown fire. Some of these units contain streams with RHCAs that are generally too wet to carry a moderate fire. However there is still a risk of a stand-replacing fire in these RHCAs under extreme weather and if the adjacent non-riparian area is experiencing a crown fire. Commercial treatments are minimized in riparian vegetation, and would occur in zone 3 where upland vegetation treatment is desired within RHCAs to reduce the risk of crown fire. There may also be treatment to improve the stand vigor where lack of fire has resulted in an overcrowded stand. This would increase the growth of remaining trees and work towards attaining the INFISH RMO for LWD. Harvest in RHCAs would not result in a canopy reduction of more than 25 percent to maintain shade and prevent increases in stream temperature beyond the INFISH RMO for temperature.

Pre-commercial Vegetation / Ladder Fuel Treatments

The objective of pre-commercial treatments is to promote large tree growth and forest health by reducing inter-tree competition. Precommercial treatments are allowed in the riparian areas of RHCAs because it promotes stand health and large diameter tree growth. It is generally applied to old plantations or treatment units in which trees are thinned with the largest, healthiest trees remaining.

Ladder fuel treatments are aimed at preventing fire from reaching tree crowns, generally by removing smaller non-commercial sized trees (ladder fuels) below the canopy. The RHCA standard widths encompass both upland and riparian vegetation in some units. To reduce the risk of crown fire developing and spreading to the riparian vegetation, the upland vegetation areas (Douglas fir, lodgepole pine, western larch, and ponderosa pine) within the RHCA standard widths may be treated by hand to remove ladder fuels. As previously stated, riparian vegetation (usually hardwood vegetation, spruce, or western red cedar) would be excluded from vegetation treatment. The resulting adjacent stands would have reduced understory ladder fuels and risk of crown fire.

Both of these treatments protect or enhance large woody debris recruitment by reducing the chance of stand replacing fire and by growing larger trees faster. Since no treatments are going to be applied within 15 feet from the streambank and cattle access would remain blocked, there would be no impact to streambanks and pools per mile. The INFISH RMOs would be maintained or improved with these two treatments.

Salvage Logging

There are numerous dead patches of trees within the project area, which increases the fire risk. Without treatment, there would be more patches and increased probability of wildfire. Salvage logging would reduce the fuels in these dead patches. By reducing the fire risk we are reducing the chance of burnover in the tributaries of Lost and Renshaw Creeks and the chance of debris torrents. Only some hazard tree removal would be applied in the RHCA but left on site per the design criteria. There would be no impacts to streambanks and pools per mile. The INFISH RMOs would be maintained.

Road Management

Roads are a major contributor to the degradation of fisheries. Road management activities have the potential to harm inland native fish and negatively affect INFISH RMOs. The following is the list of indicators to determine the scope of the effect to Inland native fish and their habitats.

Large woody debris (LWD) is negatively affected by roads in the RHCAs. These roads can cut off the RHCA from its LWD source, if it is on the non-stream side of the road. LWD that falls on the road is cut up during road maintenance. Bankfull width depth ratios are negatively affected by roads in the RHCA and roads that contribute sediment to the RHCA. Roads in valley bottoms reduce the ability of the stream to meander across the valley. This can cause bank cutting and possibly downcutting. Sedimentation from roads, either from dust or erosion, can fill channels and reduce the stream depths making streams wide and shallow, instead of narrow and deep. This filling also reduces pools per mile. Relocating and obliteration of the Rocky Creek Road would greatly improve the fisheries and INFISH RMOs. The obliterated section would be planted and eventually contribute to large woody debris in the channel. The reduction in sediment would improve pool depths and the bankfull width to depth ratio, since sediment would not be filling the bottom of the stream. Aquatic insect production should increase with less sediment leading to increased forage base for trout.

Culverts cause additional effects to stream channels when they are not sized correctly. Culverts may block overland flow, which increases the stream power downstream of the culvert. This causes bank erosion. There are no new culvert installations proposed on fish bearing streams. Fish passage would be restored at four of the crossings at tributaries of Lost Creek on the Rocky Creek Road. There are approximately 16 culvert replacements with the most notable being on the 9400500, 9400520, and 7018560 planned for the fish bearing streams, which would improve fish distribution and provide for refuge habitat.

The new road relocation for the Rocky Creek Road (Option 1) uses mainly an existing template. The new road would follow all standards and guidelines, best management practices and would not cause an adverse effect on inland native fish or RMOs.

Road reconstruction and use for haul can cause negative effects. Short-term (5-10 years) sedimentation is produced from ditch cleaning, cutslope rejuvenation for curve widening, culvert replacement, and drainage dip construction, etc. Reconstruction of the roads should result in a moderate beneficial effect over the longer term, as sediment production from road templates decreases due to new armoring, drainage structure placement, and revegetation. Many of these roads have drainage problems and are eroding into streams. The reconstruction would stop this, particularly at stream crossings and on roads parallel to streams. This would improve the BFWD ratio and pools per mile. There are slightly over 33 miles of road reconstruction proposed in the action alternative.

Without dust abatement, riparian road use for haul may contribute sediment into the streams. Rocky Creek Road runs for a substantial distance in the riparian area. If the bridges are replaced and the road reconstructed (Option 2) instead of relocating the road (Option 1), erosion off of the road would affect RMOs. Other roads identified on the roads analysis as moderate to high risk for impacts to aquatic ecosystems have segments in the RHCA. To prevent a negative impact to trout from the dust created from the haul trucks, dust abatement would be put in place at the discretion of the sale administrator. Reconstruction including the rocking of the portions of the road in the RHCA would reduce sedimentation.

Decommissioning sections of Rocky Creek Road (Option 1 post -project) and other sections of road along Lost Creek would result in a return to natural vegetative conditions along the roads and reduce sedimentation from these roads depending on which option is chosen for implementation.

If possible, the project would use temporary roads where a current template exists for the timber sale instead of building new temporary roads. Currently, these templates are compacted and do not receive maintenance of the drainage system. Because these roads are compacted, they do not have the vegetative cover or soil development that the adjacent stands have. This reduces infiltration. After use, these roads would be decompacted. It is expected that full vegetative recovery take place and no stunting of the vegetation occurs due to compaction. Approximately 1 acre of riparian areas scattered among the templates would be restored. In addition, the roads would be placed in a hydrologically inert status. Cross drains and culverts would be removed and the areas designed to drain naturally. This would prevent water from ponding on the road and potentially causing a road failure that delivers sediment into the stream system. Waterbars and road out-sloping would be used to drain the roads which would help to decrease any adverse effects using these temporary roads would have on fisheries due to sedimentation. By using these temporary roads and then having them grow back into a forest, there may be a small measureable effect to the amount of sediment cumulatively in the reach. The biggest effect is the long term stability of the stream channels by reducing the chance of a road failure. There would not be a measureable effect on the fisheries.

Because temporary roads would be put back into production and monitored for effectiveness two years following the sale, large scale loss of LWD in the RHCA is not anticipated. When temporary roads are opened for timber sales, hazard trees are removed for safety. There is a design element requiring hazard trees to be left on site in RHCAs. Some roads that are currently closed would be opened during the project. Some of these would be gated to limit access into parts of the project area. Since they would only be open during project activities, and effectively closed after, it is not anticipated that many snags would be lost. This should be fairly successful at protecting LWD in that area. The greatest concern for fisheries would be potential for compaction, rutting in wet areas, and wetland and stream disturbance if these roads become OHV routes. Prompt closure would help prevent the establishment of OHV use into new areas.

Cumulative Effects Analysis

The cumulative effects area for fisheries includes the lower portion of Lost and Renshaw Creeks. Bull trout, pygmy whitefish, Umatilla dace are not found in the cumulative effects reach. Westslope cutthroat trout and rainbow/redband trout may be found in the cumulative effects reach.

From the early 1900s, past actions at the subwatershed scale (Lost Creek and Maitlen Creek) include homesteading, grazing, timber harvest, road construction, fire wood cutting, and recreation. Timber sales, residential development, past fires, and roads can increase water yield which can cause changes in the channel morphology. This could cause negative impacts to BFWD and Pools per mile. The hydrology report (2014) states that “The effects to water yield and peak flows are expected to be unmeasurable and to mimic natural changes to the forest environment.” The activities proposed in Alternative B would not add to the cumulative effect of private, state, and past Forest Service timber activities on water yield.

Roads in the analysis area are the main contributor to reduced fish habitat quality. The road management for the Renshaw project is not expected to add any additional quantifiable amount of

sediment into the system. Reconstruction activities should in the long term reduce the erosion of the Forest Service Road system.

Cattle and recreational use in the area also contributes to reduced fish habitat quality from trampling of stream banks and reduced riparian vegetation vigor. The design criteria list the practices that would prevent increased access to riparian areas. The timber sale is not expected to increase access to riparian areas, so the status quo is expected to remain the same.

The cumulative effects of the proposed action and all past, present, and reasonably foreseeable future actions would be an improving trend for aquatic and riparian habitat in the analysis area. The risk of wildfire would be reduced in RHCAs. Large woody debris recruitment would improve, and in channel large wood levels would increase within the project analysis area. There would be no measurable negative impact to inland native fish populations, CNF MIS Species (trout), INFISH RMOS (LWD, BFWD, Pools per mile, and Temperature) in Lost and Renshaw Creeks from project activities.

Compliance with the Forest Plan as amended by INFISH

The potential effects of the proposed action on the four relevant RMOs have been analyzed in the previous sections.

Effects to the fisheries population from the proposed action would be minimal. Sedimentation from the proposed activities is expected to be minimal because the Forest would be following BMPs and design criteria. There would be a slight improvement over time, but the fisheries in the streams are what would be expected. The project would have “no effect” to Bull Trout and “no impact” to Umatilla dace and pygmy whitefish since they are not present in the analysis area and cumulative effects reach. The area is not critical habitat for Bull Trout. The project would “not likely to lead toward a trend to federal listing or loss of viability” to rainbow/redband trout and westslope cutthroat trout.

For the reasons above Alternative B has not been found to retard the attainment of these RMOs in the long term and is consistent with Forest Plan direction as amended by INFISH.

Threatened, Endangered, and Sensitive Species

Information provided in this Environmental Assessment about wildlife is excerpted from the Renshaw Biological Evaluation of Effects to TES terrestrial wildlife species by Wildlife Biologist Mike Borysewicz (August 2014); information provided about fish is excerpted from the Fisheries Biological Evaluation/Management Indicator Species report by Fisheries Biologist Karen Honeycutt (August 2014); information provided about sensitive plants is excerpted from the Biological Evaluation of Effects to Sensitive Plant Species by Botanist Kathy Ahlenslager (July 2014). All three reports are available in the project analysis files.

The following table provides a brief summary of the effects of the proposed project on threatened, endangered, and sensitive species (TES) including the rationale for each determination. No federally listed threatened or endangered plants or plants proposed for federal listing are known to occur in the analysis area (USDI FWS 2007, 2009, and 2011). See Appendix B for a full discussion of the direct, indirect, and cumulative effects of the project to terrestrial wildlife species listed as TES.

Table 10. Renshaw Project Summary – Effects Determinations for T&E Species (Alternative B, Options 1 & 2)

T&E species	Project Alternative	Determination	Rationale for Determination
Canada lynx (threatened)	A (no action)	may affect, not likely to adversely affect	Baseline habitat conditions maintained over the short term. In 10-15 years, primary prey (snowshoe hare) habitat could be lacking in the Cedar LAU[12] due to natural stand succession.
	B (proposed action)		No known lynx den site in the project area. Timber harvest in the Cedar LAU could promote about 300 acres of primary prey habitats in 10-20 years. Project is consistent with management recommendations in the Canada Lynx Conservation Assessment and Strategy (LCAS). *Cumulative effects:* Recommendations in the LCAS for unsuitable habitat would not be exceeded as a result of the combined effects of the Renshaw project, and other ongoing/proposed timber sales in the Cedar LAU. The landscape in the Renshaw area should remain permeable to lynx. Concealing cover should re-develop in all harvested areas on NFS land over a 5-10 year period.
grizzly bear (threatened)	A	no effect	Baseline habitat conditions maintained, since no new forest management activities would be initiated.
	B	may affect, not likely to adversely affect	Project lies outside of the grizzly bear recovery area. Increase in disturbance during the project, temporary reduction of small pockets of core habitat. Post-project reduction in open road density and increase in core habitat by 500-600 acres. Roadside hiding cover maintained where it exists. Potential for local improvements in green forage/berry crops from timber harvest and under-burning. Bears could have improved access to riparian habitat on Lost Creek if the Rocky Creek Road is re-routed out of the stream corridor. *Cumulative effects:* open road densities would slightly increase while the Rocky Creek Road is being re-routed, but would decrease once project is completed. Timber harvest would increase forage availability. The overall landscape should remain highly permeable to dispersing bears.
Bull trout (threatened)	all	no effect	Bull trout do not presently occupy habitat within this watershed. There is a natural fish blockage on Lost Creek. The proposed activities within the Renshaw project are expected to have 'no effect" on bull trout due to absence of the species within the project area and in the cumulative effects reaches. No cumulative effects to this species would occur.

[12] Lynx Analysis Unit.

T&E species	Project Alternative	Determination	Rationale for Determination
woodland caribou (endangered)	all	no effect	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 1988). The Renshaw Project Area is located west of the Pend Oreille River and more than 5 miles west of the Selkirk Mountains Woodland Caribou Recovery Area. Caribou have not been documented in the project area and suitable habitat is not present. No cumulative effects to this species would occur.
yellow-billed cuckoo (proposed threatened)	all	no effect	This species requires river floodplains that support dense willow and cottonwood stands (WDFW 2004). This habitat does not occur in the project area but could potentially be found along the Pend Oreille River, 1-2 miles east of the project area. No cumulative effects to this species would occur.
whitebark pine (candidate)	all	no effect	Whitebark pine is a high elevation species that does not occur in the project area. No cumulative effects to whitebark pine would occur.

Table 11. Renshaw Project Summary - Effects Determinations for Sensitive Species (Alternative B, Options 1 & 2)

Sensitive species	Project Alternative	Determination	Rationale for Determination
bald eagle	A	may impact individuals but not likely to cause a trend to federal listing	No immediate impacts to any potential habitats. Over time, increasing forest fuel loads would incrementally elevate the risk of high intensity crown fires removing large trees.
	B		No known nest in the project area. Pairs nesting on the Pend Oreille River would be too far removed to be disturbed by project activities. No large trees marked for harvest except within new equipment and road corridors, landings. Large tree habitat promoted over time with stand stocking control. Project would reduce stand densities and forest fuel loads; decreasing the risk of stand replacement fires. *Cumulative effects:* This project, combined with other activities within bald eagle habitat, would result in no cumulative effects.
common loon	A	no impact	Baseline habitat conditions for loons maintained, since no new forest management activities would be initiated.

Sensitive species	Project Alternative	Determination	Rationale for Determination
	B	not likely to cause a trend to federal listing	No known nest in the project area. No project activities would occur within 50 feet of Nile or Brown's lakes. Loons observed in the project area would be protected from disturbance with project timing restrictions, if needed. *Cumulative effects:* This project, combined with other activities within loon habitat, would result in no cumulative effects.
gray wolf, wolverine, moose	A	not likely to cause a trend to federal listing	Increasing fuel loads would continue to elevate the risk of forest cover loss to future, hot fires. Such fires could promote forage for big game (prey species).
	B		Effects to open roads same as for grizzly bears. Potential improvements in big game forage (grasses, forbs, willows, upland shrubs) from timber harvest and under-burning. Cover/forage ratios improved on deer winter ranges. Any discovered wolf den/rendezvous sites protected from disturbance with project timing restrictions. *Cumulative effects:* this project would not contribute to any cumulative effects to wolf den or rendezvous sites. Open road densities would slightly increase while the Rocky Creek Road is being re-routed, but would decrease once project is completed. There would be no cumulative effects to the habitat composition of big game winter ranges, or to the seclusion needs of wintering big game. Alternative B would move the project area toward a more historic fire regime; where big game forage could be maintained at more stable levels over time.
great gray owl	A	not likely to cause a trend to federal listing	Increasing fuel loads would continue to elevate the risk of forest cover loss to future, hot fires. Such fires could remove potential nest stands.
	B		Nesting has not been documented on the forest. Existing late & old structural stage stands (potential nesting habitat) maintained. Timber harvest and under-burning would create forest openings and edge habitat, and stimulate the growth of grasses and forbs. Meadows maintained through the removal of encroaching conifers. These actions could create/maintain foraging habitats. *Cumulative effects:* Timber harvest would provide additional green forage resources and create openings that could be used by gray owls.
harlequin duck	A	not likely to cause a trend to federal listing	No immediate change in the already low habitat suitability in the project area. Increasing fuel loads would continue to elevate the risk of riparian forest cover loss to future, hot fires.

Sensitive species	Project Alternative	Determination	Rationale for Determination
	B		Project activities within Riparian Habitat Conservation Areas (RHCAs) would be designed to maintain or improve riparian habitat characteristics such as stream shading. If Rocky Creek Road is re-routed, the suitability of Lost Creek for nesting purposes would improve. *Cumulative Effects:* No cumulative effects to this species would occur.
pygmy shrew	A	not likely to cause a trend to federal listing	Over the long term, increasing fuel loads would continue to elevate the risk of stand-replacing fires burning over large tracts of forest.
	B		Individual shrews could be killed in areas of logging/fuel reduction operations. New roads/equipment corridors and landings would remove low cover and compact soils. However, the project would create large areas of disturbed, stand initiation habitats preferred by this species. Ground vegetation should quickly re-grow in harvested/burned areas and could become more dense/robust due to improved light levels. Fifty-foot, no harvest buffers around wetlands and water bodies. *Cumulative effects:* loss and restoration of habitat from the Renshaw project and other projects would offset each other, resulting in no cumulative effects.
red-tailed chipmunk	A	not likely to cause a trend to federal listing	No immediate impacts to essential habitats. Over the long term, increasing fuel loads would continue to elevate the risk of stand-replacing fires burning over large tracts of forest.
	B		Timber harvest would reduce the overhead tree canopy and cone availability, particularly where openings are created. No late & old structural stage stands harvested. Large trees would be retained in harvested areas. The Renshaw project would reduce forest fuel loads, decreasing the risk of fire spread into overstory tree crowns. Timber harvest and under-burning would create forest openings and edge habitat, and stimulate the growth of diverse understories of grasses and forbs. New foraging sites could thus be created. *Cumulative Effects:* loss and restoration of habitat from the Renshaw project and other projects would offset each other, resulting in no cumulative effects.
sandhill crane	A	not likely to cause a trend to federal listing	Over time, meadow habitats could decline in extent with natural forest succession. Long-term maintenance of these sites subject to available funding.

Sensitive species	Project Alternative	Determination	Rationale for Determination
	B		Nesting has not been documented on the forest. Cranes observed in the project area would be protected from disturbance with project timing restrictions, if needed. Renshaw project could fund meadow maintenance activities. *Cumulative Effects:* potential nesting habitats for sandhill cranes would continue to be rare, isolated, and limited in extent. No cumulative effects to this species anticipated.
sensitive invertebrates	A	not likely to cause a trend to federal listing	No immediate impacts to essential habitats. Over time forest openings and edge habitats would decline in the area through natural forest succession. Long-term maintenance of meadows subject to available funding.
	B		Less mobile individuals could be killed in areas of logging/fuel reduction operations. Food plants could be removed and down logs and other structures degraded. However, forest openings and edge habitats would be created through timber harvest. Forest management activities would not occur within 50 feet of wetlands and meadows. Streamside RHCAs managed to acquire desired vegetation characteristics. Most large logs retained in harvest units. Rock talus avoided. Renshaw project could fund meadow maintenance activities. *Cumulative effects:* potential effects of livestock grazing offset by no-harvest buffers specific to RHCAs, resulting in no cumulative effects.
Redband trout (sensitive)	all	may impact individuals but not likely to cause a trend to federal listing or loss of viability.	Implementation of Alternative B would overall improve fish habitat in the long term. Pure interior redband trout are not known to inhabit the analysis area nor the larger watershed. No cumulative effects to this species would occur.
Westslope cutthroat trout (sensitive)	all	may impact individuals but not likely to cause a trend to federal listing or loss of viability.	Implementation of the action alternatives would overall improve fish habitat in the long term. Pure westslope cutthroat trout are not known to inhabit the analysis area nor the larger watershed. Westslope Cutthroat trout may be present in the cumulative effects reach. No cumulative effects to this species are anticipated.
Umatilla dace (sensitive)	all	no impact	Implementation of the action alternatives would overall improve fish habitat in the long term. Umatilla dace are not known to inhabit the analysis area nor the larger watershed. No cumulative effects to this species would occur.
Pygmy whitefish (sensitive)	all	no impact	Pygmy whitefish are not present in the analysis area and cumulative effects reach. No cumulative effects to this species would occur.

Sensitive species	Project Alternative	Determination	Rationale for Determination
Sensitive plant species: western moonwort stalked moonwort poor sedge beaked sedge bulb-bearing water hemlock crested shield fern green keeled cotton-grass water avens adder's tongue	all	may impact individual sensitive plants, but are not likely to result in a trend to federal listing or loss of viability of any sensitive plant species	Four sensitive plants (western moonwort, stalked moonwort, crested shield fern, and green keeled cotton-grass) occur in six units proposed for commercial treatments in Alternative B. Another ten units have eight sensitive plants within 100 feet (western moonwort, stalked moonwort, poor sedge, beaked sedge, bulb-bearing water hemlock, crested shield fern, green keeled cotton-grass, and adders' tongue) Eight sensitive plants (western moonwort, stalked moonwort, poor sedge, beaked sedge, bulb-bearing water hemlock, crested shield fern, water avens, and adder's tongue) occur in three stands proposed for non-commercial underburn. Three sensitive plants (poor sedge, beaked sedge, and crested shield fern) locations are within 100 feet of proposed road decommissioning in Option 1. By buffering the sensitive plant sites occurring in proposed commercial and non-commercial treatment units, 100 to 150 feet or to the topographic break, there should be no negative effects on the sensitive species. There are no known locations of sensitive plants within proposed new system road construction, temporary road construction sites or reconstruction locations. If the design criteria for this analysis area are implemented, then the proposed activities should not negatively affect sensitive plants. *Cumulative Effects:* With implementation of design criteria included to protect RHCAs, no cumulative effects to sensitive plant species and population viability would occur.

Based on the preceding table, the alternatives as proposed are consistent with Forest Plan standards and guidelines (as amended) for TES.

Cumulative Effects

Past, present (Lost Complex Grazing Allotment Decision Notice and Environmental Assessment, recreation use), and reasonably foreseeable projects were considered in the analysis. The combined effects of timber harvest, prescribed fires, cattle grazing, noxious weeds, and hazardous tree removal could negatively affect sensitive plant species over their ranges. With the addition of the design criteria listed in chapter 2, and those included to protect Riparian Habitat Conservation Areas, no effects to sensitive plant population viability are anticipated from this project and therefore no cumulative effects are anticipated.

Documentation of cumulative effects related to terrestrial and aquatic species is disclosed by species in the terrestrial wildlife biological evaluation in Appendix B and in the biological evaluation for aquatic species in the project file.

Management Indicator Species

Information provided in this Environmental Assessment about management indicator species is excerpted from the Renshaw Analysis of Effects to Management Indicator Species and Landbirds Report by Wildlife Biologist Mike Borysewicz (August 2014). Full discussion of effects is located in the specialist report in the project file. Rather than attempt to manage for each of the hundreds of vertebrates found on the Colville National Forest (CNF), the MIS approach singles out a few representative species for active management and conservation. Essential habitats provided for each indicator species would in turn support many other animals with similar habitat requirements.

The following table summarizes the potential effects of the proposed Renshaw Vegetation Management Project on management indicator species and landbirds.

Table 12. Summary of Effects to MIS Species by Alternative (Alternative B, Options 1 & 2)

Species	Alt.	Summary of Project Effects
beaver	A	Aspen and other hardwoods would continue to be over-topped and slowly shaded out by growing conifers in forest stands across the landscape. This process could be reversed in areas that experience future wildfires. All existing habitats for beavers would be maintained in the project area with this alternative, at least in the short term.
	B	Timber harvest and fuels treatments would maintain/restore hardwoods where they exist by reducing conifer canopy. Habitat improvements such as aspen/riparian fencing to exclude livestock would improve riparian function and food resources for beavers. *Cumulative effects*: Future timber harvest and prescribed burning adjacent to aquatic and riparian habitats is likely to benefit hardwoods, and potentially beavers over time.
pine marten, barred owl, pileated woodpecker	A	No immediate effects to essential habitat components beyond those resulting from continuing activities such as firewood gathering. Increasing fuel loads would continue to elevate the risk of source habitat loss to future stand-replacing fires that could remove potential reproductive habitat for the three MIS. Such fires could sever travel corridors for furbearers across the landscape.
	B	No project activities within late and old structural stage stands (including old growth), or designated core habitat areas. The great majority of large trees (21+ inches) would be retained. Over the long term, intermediate harvests (ex. comm. thin) should accelerate the development of large tree habitats. Timber harvest and fuels treatments would reduce overhead canopy and horizontal cover in a few young, multi-storied stands (SS5). Forest fuel loads would be reduced, leading to a reduced risk of intense fire behavior. Project activities within travel corridors would maintain overhead canopy and understory cover according to existing direction (Lowe 1995). *Cumulative effects*: Since 1995, the CNF has been managing source habitats for old growth associated species based on the concept of Historic Range of Variability (HRV). Stand-replacing fires of the 20s & 30s and timber sales that occurred during most of the 20th century reduced the availability of source habitats across the forest. By moving the stand structural stage mix in the project area closer to the HRV, we should initiate a trend to providing the range of source habitat levels that existed in pre-settlement times.

Species	Alt.	Summary of Project Effects
primary cavity excavators (woodpeckers)	A	Dead tree habitats would be recruited or lost according to natural processes. Increasing fuel loads would continue to elevate the risk of destructive, stand replacing fires, reducing habitat for primary cavity excavators that require overhead tree canopy. Such fires would create a short-term (2-3 decade) "pulse" of habitat, followed by a decades-long period of greatly reduced habitat levels as forest stands grow back in burned areas.
	B	Timber harvest and fuels treatments would reduce dead tree habitat over the short to mid-term. Most habitats lost would be smaller diameter snags (< 10 inches) and logs (< 14 inches). Large diameter tree recruitment would be accelerated through tree stocking control. Large snags and logs would be recruited from these trees over time. The project would move the watershed closer to its historic fire regime by thinning out dense stands and reducing forest fuel loading. Over the long run, Alternative B should result in a more stable/continuous supply of larger diameter snags and down logs than would be the case with Alternative A. *Cumulative effects*: Stand-replacing fires of the 20s & 30s and timber sales that occurred during most of the 20th century reduced the availability of large snag and down log habitat across the forest. By moving the stand structural stage mix in the project area closer to the HRV, the project would reduce the risk of stand replacing fires and provide a more continuous supply of dead wood habitat than had no forest management occurred.
northern three-toed woodpecker	A	Habitat for three-toed woodpeckers would be recruited or lost according to natural processes. Increasing fuel loads would continue to elevate the risk of high-intensity fires that could remove entire stands of mature lodgepole pine or subalpine fir, habitats important to this species.
	B	Project activities would mostly occur at lower elevations than those used by this species. All thrifty subalpine fir and spruce trees maintained in harvest units above 4,000 feet. Source habitats maintained in core habitat areas for old growth associated species. *Cumulative effects:* Source habitats for this species and large diameter snags have declined from historical levels (Wisdom et al. 2000) due to past timber harvest, as well as large-scale wildfires which burned over much of the forest in the 20s and 30s. Moving the stand structural stage mix in the project area closer to the HRV should lead to the recruitment of additional late and old structural stage stands over time.
dusky (blue) grouse	A	Increasing fuel loads would continue to elevate the risk of roost tree loss to future, high intensity crown fires. Over time, natural forest succession could lead to a decline in the acreage of homestead meadows that provide quality brood-rearing habitats for this grouse (Ware 2003)
	B	Most winter roost trees on high elevation ridgetops protected. Winter roost habitat potentially enhanced through thinning/prescribed burning. Edge habitat created on the perimeters of regeneration harvest units. Open park-like stands (brood habitat) promoted through thinning/prescribed burning. Renshaw project could fund meadow maintenance activities. *Cumulative effects are not expected.*
spruce (Franklin's) grouse	A	Suitable habitat in the subalpine fir biophysical zone would decline over time as trees in dense young plantations continue to grow. Increasing risk of high-intensity fires that could set back forest succession and create additional habitat over time.

Species	Alt.	Summary of Project Effects
	B	Renshaw project would increase the acreage of younger age class stands in the upper elevations of the project area. Within 10-20 years, some of these treated acres could provide suitable habitat conditions. *Cumulative effects are not expected.*
large raptors and great blue herons	A	Increasing fuel loads would continue to elevate the risk of large tree loss to future, high intensity crown fires. Such fires could remove suitable nest trees or stands for large raptors and herons. Extensive burned areas would lack concealing cover for ambush hunters such as goshawks.
	B	No known nests from the project area. Nest trees/stands discovered during the preparation phase of the timber sale would be protected according to existing guidance. Also see the effects to essential habitats for beavers (hardwoods), pine marten (old forest stands) and primary cavity excavators (snags and logs).
waterfowl	A	No immediate effects. Over long periods of time, certain wetlands and ponds in the area might be lost to natural forest succession, reducing the availability of these sites to waterfowl. This process could be reversed through water impoundments created by beavers.
	B	Existing ponds and wetland habitats protected by avoidance. Large snags used by cavity nesting ducks protected. Disturbance to active nests should be local, temporary, and small enough in scale as to be insignificant or discountable to the overall nesting population. *Cumulative effects are not expected*.
landbirds	A	Fir regeneration would continue to encroach into many forest stands. Lodgepole pine stands would become decadent and susceptible to insect attack in 1-2 decades. These processes would tend to increase the potential for a large, hot wildfire to remove entire swaths of priority forest habitats for landbirds across the project area.
	B	Wetlands, rock features, alpine areas would be avoided. Hardwood trees retained in harvest units. The great majority of large live and dead trees retained in harvest units. Additional large trees promoted through thinning and fuels treatments. Reduced risk of intense wildfire behavior. Renshaw project could fund meadow maintenance activities. *Cumulative effects*: see discussion of cumulative effects to essential habitats for beavers (riparian habitats & hardwoods), old growth associated species (mature mesic and dry conifer forests, large tree habitats), primary cavity excavators (dead wood habitats), and dusky grouse (montane meadows).

Based on the preceding table, the alternatives as proposed are consistent with Forest Plan standards and guidelines for MIS (as amended). Alternative B would move the analysis area closer to its historic condition with regards to tree species mix, stocking levels, stand structural stages, and fuel loading.

Noxious Weeds

Information provided in this Environmental Assessment about noxious weeds is excerpted from the Renshaw Noxious Weeds Report by Noxious Weed Coordinator Chase Bolyard (July 2014). The full report is available in the project analysis files.

Affected Environment

Many noxious weed species are present and established within the Renshaw project area, therefore, only the prevention of weed spread and/or the compounding of weed problems that could result from the alternatives will be discussed. The project will not address the treatment of existing weed locations or the spread of weeds that could occur independently of the actions proposed in alternatives. Treatment of existing noxious weeds within the project area is addressed in the Colville National Forest Integrated Noxious Weed Treatment Environmental Assessment (1998) and supported by the Pacific Northwest Region Invasive Plant Program EIS and ROD (2005).

Noxious weeds are non-native plants that have been introduced and can be highly destructive, competitive and difficult to control. Noxious weeds can lead to degraded plant and animal habitat, displace native vegetation, increase erosion and some are toxic to animals.

The following table displays the noxious weed and invasive species known to exist within the project area and their control category as determined by the Washington State Noxious Weed Control Board.

Table 13. Noxious Weed Species Present in the Analysis Area

SPECIES	CONTROL CATEGORY
Cheatgrass	Unclassified
Common Mullein	Unclassified
Common Bugloss	Class B Non-Designate
Dalmation Toadflax	Class B Non-Designate
Diffuse and Spotted Knapweed	Class B Non-Designate
Hoary Alyssum	Class B Non-Designate
Orange Hawkweed	Class B Non-Designate
Oxeye Daisy	Class B Non-Designate
Sulfur Cinquefoil	Class B Non-Designate
Yellow Hawkweed	Class B Non-Designate
Bull Thistle	Class C
Canada Thistle	Class C
Hounds tongue	Class C
St. Johnswort	Class C

The Washington State Noxious Weed Control Board has developed control categories to prioritize noxious weed species based on the seriousness of the threat they pose. Noxious weeds are classified into three major classes; Class A, Class B, and Class C. (see Table 13)

The Colville National Forest has been engaged in noxious weed treatments in the project area since 1979. Currently, noxious weed treatments have been occurring under the direction of, and in compliance with, the Colville National Forest's 1998 Environmental Assessment for Integrated Noxious Weed Treatment and the 2005 Pacific Northwest Region Invasive Plant Program Environmental Impact Statement. The Colville National Forest utilizes an integrated pest management approach to controlling noxious weeds. Noxious weed treatments have primarily focused on herbicide application, but cultural, mechanical and biological control methods have also been employed.

Most noxious weed populations found within the Renshaw project area are associated with forest roads and trails. Roads and trails are areas of disturbance with bare soil, which is susceptible to noxious weed establishment, and they act as vectors to spread noxious weeds by vehicular use.

Effects Common to Alternatives A & B

Warming climates may remove elevational barriers to invasive plant distribution that currently exist (Tausch 2008).

Many invasive plants are species that can thrive in the presence of disturbance and other environmental stressors, have broad climatic tolerances, large geographic ranges, and possess other characteristics that facilitate rapid range shifts. The predicted changes in climate are thought to contribute additional stressors on ecosystems, including those on National Forests, making them more susceptible to invasion and establishment of invasive plant species (Joyce et al. 2008).

Predicted conditions may also make management of invasive species more difficult. Some current treatments used on invasive plants may be less effective under conditions of climate change scenarios and/or elevated CO^2 (Hellmann et al. 2008, Pike et al. 2008, Ziska, Faulkner, and Lydon 2004).

Direct and Indirect Effects of Alternative A

Given that several different species of noxious weeds occur within the project area and that some of the private property bordering the Renshaw project area is infested with noxious weeds, it is likely that noxious weeds would continue to occur within the project area.

Houndstongue would continue to persist and increase. This plant has the ability to establish in open meadows and open canopy forests in the area.

Yellow hawkweed infestations would likely increase slightly within the project area. Populations with limited spatial distribution may be able to be effectively controlled, but it is expected that the total infested acres would remain relatively consistent due to the wind-born nature of the seeds. Populations of yellow hawkweed have not spread to undisturbed canopies within the project area but are common in areas of prior harvest activity that has opened the canopy. Orange hawkweed is limited in distribution in the project area, especially as compared to yellow hawkweed.

Common bugloss is expected to re-establish in small populations that are easily controlled due to known populations on private lands adjacent to the analysis areas and former infestations on NFS lands. These populations should be able to be effectively controlled to prevent spread of this species.

Knapweed, Dalmatian toadflax, sulfur cinquefoil, St. Johnswort, and oxeye daisy are all well-established throughout the project area. Emphasis would be placed on controlling large infestations with spot treatments along roadways, dispersed recreation sites, and meadows as needed. These plants would continue to persist in the project area as seeds and plant material are dispersed by domestic livestock, wildlife, vehicles, OHVs and people.

Direct and Indirect Effects of Alternative B

Vegetation Management

Within the Renshaw Analysis area, the following projects have the potential to disturb vegetation and soil and become infested with noxious weeds: commercial harvest and associated landings; road construction, reconstruction and decommissioning; prescribed fire; and mechanical fuel treatment. This alternative would incorporate all design criteria for management of noxious weeds listed in chapter 2.

Commercial thinning and mechanical fireline construction have the most elevated risk for noxious weed establishment of the proposed treatment methods because there is the greatest likelihood of ground disturbance caused by equipment or concentrated use. The types of activities associated with harvesting trees, conveying them to a landing and decking them create areas where mineral soil could be exposed.

New road construction, road reconstruction and road decommissioning produce areas that have the greatest risk for noxious weed establishment. These activities create substantial and often continuous areas of disturbance where nearly all native vegetation is removed and mineral soil is left exposed without desirable vegetation to colonize the area.

By adhering to design criteria listed in chapter 2 and management practices under management objectives 3, 5, 6 and 7 of the Colville National Forest Weed Prevention Guidelines, noxious weed populations are not likely to spread substantially. A decrease in the total number of acres infested with noxious weeds may be realized due to control efforts and mitigating measures within the project area.

Cumulative Effects

Noxious weeds have occurred within the project area for many decades and the Forest has been treating noxious weed populations in the area since approximately 1992. New noxious weed threats continue to advance onto Forest Service lands as they have for many decades and the Forest continues to treat these areas based on priority. Noxious weed populations are continually evolving because of species that are new invaders becoming established and the transporting of noxious weed reproductive parts, which allows for the infestation of other areas.

Other activities that disturb vegetation and soils that occur in the planning area include routine road maintenance, harvest activities on private land, recreational use, livestock grazing, prescribed burning, wildfire, noxious weed treatments, road decommissioning, and firewood gathering. These activities equate to a constant threat of noxious weeds becoming established within the planning area due to noxious weed seeds being transported by vehicles, equipment and livestock to disturbed soils. Livestock are a relatively minor vector in spreading many of the noxious weeds found to exist within the planning area; therefore, continued livestock grazing is likely to contribute very little to the spread or establishment of noxious weeds.

Off-highway vehicle use has some potential to spread noxious weeds within the project area. These activities create substantial and often continuous areas of disturbance where nearly all native vegetation is removed and mineral soil is left exposed without desirable vegetation to colonize the area. Disturbed areas create a seedbed readily susceptible to noxious weed invasion.

If roads do not have effective closures in place that effectively limit motorized access, these types of roads and the areas they service have the potential to become infested with noxious weeds. This is especially true when off-road vehicles are able to breach barriers and transport noxious weed seed to the areas behind closure devices, thereby establishing noxious weeds populations.

The activities in the proposed action would not cumulatively negatively affect noxious weeds within or outside the Forest Boundary. The acres of noxious weed infestations are not likely to increase as a result of the project, but there is a risk of noxious weed establishment for roads that will be closed following treatment if road closure devices are compromised and/or breached thereby allowing motorized access.

The history and nature of the noxious weed situation on the Colville National Forest suggests that noxious weeds would continue to exist on the landscape within the Renshaw project area after completion of the project as it does prior to the proposed action. Noxious weeds would be treated and monitored within the project area, but they will not likely be eliminated as a result of the activities and efforts proposed for this project, nor by the continued Forest noxious weed treatment program. Noxious weed monitoring and treatment efforts required by the project would likely act to reduce the level of noxious weed infestations that currently exist within the project

area, but would not eliminate them because of the continuing threat of noxious weed establishment resulting from seed transportation on the level 2 and 3 roads open to travel and the infestations on adjoining private property.

All proposed activities of the Renshaw Vegetation Management Project meet the Colville National Forest Land and Resource Management Plan Standards for integrated pest management and the Pacific Northwest Region Invasive Plant Program Preventing and Managing Invasive Plants Record of Decision, which amended the Forest Plan.

Rangeland Management

Information provided in this Environmental Assessment about rangeland management is excerpted from the Renshaw Range Management Report by Rangeland Management Specialist Chase Bolyard (July 2014). The full report is available in the project analysis files.

Affected Environment

The Renshaw project area overlaps with the Tiger Hill Allotment, which is a cattle and horse grazing allotment currently managed by a single permittee and supporting a total of 174 cow/calf pair with a grazing season of June 1 to September 30. Grazing within this allotment occurs in correlation with the Allotment Management Plan as well as the Lost Complex Grazing EA signed in 2005. The allotment is managed using a 4 pasture deferred rotation grazing system. According to past and recent monitoring information grazing use is occurring at acceptable levels and within the specified use levels.

Range Improvements

Existing range improvements for the Tiger Hill Allotment consist of six livestock management fences totaling approximately 8 miles and one corral/loading chute. The fencing was put in place in order to create allotment and pasture boundaries as well as reduce cattle drift. There are no developed water sources within this allotment, so cattle are required to water at streams and undeveloped springs within the allotment. Range improvements are maintained at least annually by the permittee.

Direct and Indirect Effects of Alternative A

The No Action alternative would result in no timber harvest, precommercial thinning or prescribed fire activities within any portion of the Renshaw analysis area.

Short-term effects of this alternative would result in little or no change in the range resource compared to the existing condition. Livestock would continue to graze on the allotment and range improvements (such as fences, water developments and corrals) would exist on the landscape and be used to manage grazing.

Long-term effects of the “no action” alternative would be the perpetuation of denser stands of small diameter trees that provide little value for production of forage. Such stands typically have closely spaced tree canopies that allow little sunlight to reach the forest floor. The understory found in these types of environments usually consists of few grasses and are therefore, generally not used by livestock. These types of stands also provide a benefit to livestock management by creating natural barriers which act to restrict livestock movement. In areas of dense timber, where there is little or no herbaceous vegetation for an extended distance, livestock do not pass through because they will not utilize areas that do not provide adequate foraging conditions. By having

intact natural barriers which limit livestock movement, the need for fencing to manage livestock movement is less.

Excluding wildfire, the No Action alternative would allow conifers to continue encroaching into the more open and grassy areas of the allotments and thereby reducing the forage producing capability of the allotment. When trees encroach into upland grassy areas, they generally become more inaccessible and unavailable to livestock. As there is less forage for livestock in the upland areas of pastures, it is likely that grazing pressure would increase on lower elevation riparian areas therefore adversely impacting these pastures.

This alternative would produce and propagate a forest condition that has a large amount of natural fuels. High levels of natural fuels could result in large stand-replacing fires burning the landscape. These types of fires would likely be more damaging to the forage base that supports livestock grazing in the short-term time frame than prescribed fire. Wildfire could occur while plants are still growing and before they have produced mature seed that is needed to regenerate these areas and provide better foraging habitat for cattle. Without this regeneration, adverse impacts to other areas due to increased grazing pressure could occur.

This alternative has a greater potential to adversely affect range management because forage production would decrease as tree densities continue to increase. As the amount of uplands that support grazing decreases due to the encroachment of trees, riparian area impacts would likely increase.

Under this alternative range improvements, such as fences and water developments would be at greater risk of having wildfire damage or destroy them. If a wildfire were to occur within the project area, there would likely be little done to protect range improvements and the improvements would have to be reconstructed.

Direct and Indirect Effects of Alternative B

The Renshaw project would create approximately 3,800 acres of transitory rangeland in the Tiger Hill Allotment. The transitory rangelands that would be created by the Renshaw project would be beneficial to livestock management by reducing grazing pressure on heavily grazed areas, but would not alter the livestock handling capacity or stocking rate of the allotment.

There are fences used for managing livestock in or adjacent to the following units: 1, 38, 51, 102, 128, 129, 131, 133, 134, 136, 148, 149, 163, 191, 203, 244, 290, and 291. If these fences are going to interfere with harvest activities, they can be removed prior to harvest beginning in these units. However, it is important that they be returned to their pre-harvest condition after harvest activities have been completed to ensure they remain effective at limiting livestock movement. The district rangeland management specialist would coordinate with the timber staff to ensure that they are aware of newly constructed improvements within the project area.

Vegetation and fuels treatments in units 5, 7, 38, 59, 67, 89, 102, 108, 119, 122, 129, 131, 136, 141, 163, 177, 178, 180, 191, 203, 224, 231, 286, 287, and 338 have the potential to remove approximately 4.5 miles of natural barrier that may need to be replaced by fencing. This is an estimate and this area would need to be monitored following treatment to assess the actual need.

Cumulative Effects

This cumulative effects analysis considers the effects of the Renshaw project on livestock grazing when considered with past, ongoing and reasonably foreseeable future actions. The geographic

cumulative effects are limited to the portion of the Tiger Hill Allotment which overlaps with the project area boundary.

Between approximately 1975 and 1995 there was a dramatic increase in the amount of roads and timber harvest units which provided livestock access to riparian areas. In the past, many of these activities also prescribed the use of palatable forage species when seeding for erosion control in all areas including riparian areas. This created an environment that attracted livestock into riparian areas and provided desirable forage that allowed them to stay in these areas rather than moving on to native upland foraging areas. Creation and improvement of rangelands in upland areas would help draw cattle away from these historic use areas.

Past timber harvest activities have resulted in a positive effect on the forage base for this allotment. Timber harvest created openings in the forest which provided temporary additional forage for livestock by way of creating transitory rangelands. When transitory rangeland is created and available, it reduces the level of grazing pressure on primary and secondary rangeland. Transitional rangelands also provide an abundance of forage for livestock which produces heavier calves for the producers and higher economic gains when their calves are sold at market. Having a mix of transitory rangelands mixed with primary and secondary rangelands are beneficial to livestock grazing.

The proposed treatments within this planning area have the potential to remove some natural barriers which limit livestock movement on the forest. Mitigating measures have been identified to address the potential effects of natural barrier removal, but constructing new fencing produces additional maintenance requirements that are likely to continue far into the future.

If timber stands near the Forest and allotment boundaries become less dense after implementation of the proposed action, instances of livestock drifting off of the Forest and onto private lands that border the Forest could increase. If appropriate locations for fencing to stop livestock drift off of the Forest cannot be found, permitted livestock may access private lands more often. Due to Forest Service policy stating that it does not build or maintain private property boundary fencing, impacts to adjoining land owners could be realized if private land owners decide they need to construct fencing to keep permitted livestock off of their land.

Current timber harvest levels on the Forest are greatly reduced as compared to the mid-1990s. This means that there is less transitory range being created by vegetation management projects on the Forest than there has been in the past. This compared with a switch from regeneration harvesting (clear-cut, seed tree and shelterwood treatments) to intermediate harvests (thinning) has decreased the number of openings being created in the forest and the resulting available forage. The amount of transitory rangeland within the entire project area would increase following implementation and would provide valuable upland foraging opportunities for livestock, thereby attracting them away from riparian areas.

Past road construction activities have generally been beneficial to range management by providing access to construct improvements such as water developments and fences, as well as improving access in some areas which helps the permittee to manage livestock. Roads that are near range improvement projects provide a way to get supplies to improvements and aid in project maintenance activities. Having roads within grazing allotments also allows permittees to distribute salt to livestock, check on the location of livestock and bring livestock onto and off of allotments with greater efficiency. Roads can also act as routes to trail livestock on while moving from one area to another. Both open and closed roads aid permittees in the management of their allotments. The amount of road construction and decommissioning proposed by the Renshaw

project would not likely alter range or livestock management. The roads proposed for decommissioning do not access areas of primary rangelands or rangeland improvement projects.

Ongoing and future noxious weed treatments are helping to reduce noxious weed populations that may be spread by livestock. The mitigation measures specific to the Renshaw project should limit the spread of noxious weeds within and around the project area.

The proposed action should improve transitory rangelands and benefit permit/livestock management because it would produce additional upland grazing opportunities and help to attract livestock away from riparian areas. As a result of the proposed action, overall riparian health should improve because of the creation of transitory rangeland in the uplands of the allotments. These transitory rangelands generally are able to produce additional forage for a period of time between 10-25 years. The proposed action also would allow the permittee to continue grazing at current levels with greater economic returns. Federal lands are very important in the production of red meat to supply public demand (Holechek, 1981). This in turn would help maintain the local grazing industry, the ranching lifestyle and the local economy.

The activities in the proposed action combined with past, ongoing and reasonably foreseeable future actions would not cumulatively negatively affect range management within the Forest Service grazing allotment. The effects analysis determination is that Alternative B would meet Forest Plan direction for range management

Physical Factors

Soils

Information provided in this Environmental Assessment about soil is excerpted from the Renshaw Soil Report by Soil Scientist Jason Jimenez (July 2014). The full report is available in the project analysis files.

Affected Environment

Stumps and old roads, indicative of past timber harvest, are found intermittently throughout the analysis area. Forest Service records and aerial photos indicate that some of the National Forest land in the analysis area has had timber harvest since 1930. Logging prior to the 1930s occurred in conjunction with homesteading and settlement of the area. Harvested areas have often been logged more than once. Repeated entries, especially where new roads, skid trails, and landings are used instead of existing ones, can create extensive soil compaction and soil disturbance.

The west side of the project area was burned in 1929 and the east side of the project area was burned between 1926 and 1931. Evidence of the fire was seen in scattered parts of the project from burned snags and course woody debris and charcoal in the soil profile. The absence of fire lowers rates of nutrient cycling and decomposition due to cooler soil temperature lower microbial metabolism and the buildup of thicker duff/litter layers (DeLuca and Zouhar, 2000; Neary et al., 1999). Higher leaf areas that have resulted from fire exclusion reduce soil water and solar radiation, which slows nutrient cycling and decomposition. Fire exclusion has also allowed grass and shrub plant communities to become forested, which would reduce organic matter input (Biswell, 1989; Sugihara, 2006).

The only active allotment in the area is the Tiger Hill Allotment (which extends beyond the project area) and is stocked from June 1- September 30 with 174 cow/calf pair. There are several meadows which appear to have moderate to high use by cattle, soil and water conditions may be functioning at risk (field observations, 2013-2014, botany surveys).

Most of this area receives a low level of dispersed camping. The impacts of dispersed camping on soil and vegetation are considered to be substantial but are very limited in area thus are of limited significance at the project and landscape scale. Off highway vehicle (OHV) use was observed on all the open roads, and many closed roads. OHV use of a closed road does not affect site productivity. Roads have been designated for travel and not the growing of vegetation so soil productivity stands do not apply.

The Air Force Survival School uses the project area for the training of primitive survival skills as well as escape and evasion training. Some user created trails and high use areas were observed during survey. Limited detrimental soil conditions in these areas do not pose a threat to soil quality or soil productivity and are not large enough in extent to quantify.

Prime farmland is defined by a criterion of nine different soil characteristics including soil moisture regime, soil temperature regime, soil texture, soil chemistry, and others. The Renshaw project contains approximately 23 acres of prime farmland, with approximately ½ within timber Unit 93 adjacent to Tiger Meadow (USDA National Resource Conservation Service, 1992). Best management practices and soil design criteria detailed in chapter 2 would limit detrimental soil conditions below standard and guidelines and protect the qualities of prime farmland.

Direct and Indirect Effects of Alternative A

Under this alternative, no management related direct effects would occur because there would be no new anthropogenic soil disturbances. There would be no increases in detrimental soil conditions from treatment activities.

Fire Exclusion

The Colville National Forest has a history of large high severity fires and would continue to repeat this history unless the characteristics of the forest are maintained at fuel loading and stand structure characters that are resilient to disturbance and supports active fire without uncharacteristic mortality or severity. Soil productivity and soil quality at the landscape scale would not be maintained by options that keep the fire regime and potential vegetation outside a condition that is resilient to active fire and increasing moisture stress from climate change.

The potential effects of no action (increasing fuel loading and moisture stress from high-density stand), potential for larger scale, greater severity disturbances, and the shifting climatic regime with changes in temperatures and moisture distribution could result in detrimental soil conditions expanding and exceeding Regional Soil Quality Standards and Guidelines and Forest Plan Standards.

Direct and Indirect Effects of Alternative B

The Effects of commercial harvest

Slope stability

The loss of root strength or increased soil moisture or both after tree removal can lower the slope safety factor sufficiently that a moderate storm with an associated rise in pore water pressure can result in slope failure (Swanson, 1974.) After trees are removed, the frequency of landslides can

increase (Ziemer, 1981). Steep slopes (greater than 35 percent) with shallow soils and heavy removal of the overstory vegetation increase the risk for landslides. Partial cutting, the provision of leave areas (skips), and the retention of understory vegetation help minimize landslide potentials (Dhakal and Sidle, 2003). Areas of high potential for slope stability failures have been reviewed and evaluated for the proposed treatment units and there is low potential risk for slope stability failures to exceed Regional Soil Quality Standards and Guidelines or Forest Plan standards.

Soil hydrologic function

Soil compaction would increase over the short term and long term but remain within Regional Soil Quality Standards and Guidelines based on implementation of design criteria presented in chapter 2. Commercial timber harvest with ground-based equipment would increase soil compaction (Alexander and Poff, 1985) but management requirements would limit increases. Decreases in soil porosity from compaction should not negatively affect tree productivity (Powers, 2002).

Nutrient cycling, filtering, and buffering, and carbon storage

With the proposed harvest treatments, there is a potential for losses in soil organic carbon and soil organic matter, but not in amounts that would reduce soil quality and soil productivity (Johnson and Curtis, 2001; Powers, 2002.) With management requirements, treatments would increase decomposition and facilitate increased inputs of soil organic matter into the soil profile through slash, coarse woody material, and root decomposition and implementation of design criteria in in chapter 2 (Brown et al., 2003).

The Effects of Other Mechanical Treatments

Slope stability

With treatments that increase soil cover, no potential decreases in slope stability would occur. Grapple piling and thinning with ground-based mechanical equipment typically does not occur on slopes steep enough or change soil moisture dynamics enough to increase slope stability hazards.

Soil hydrologic function

Due to increasing ground cover with mastication, there is no anticipated significant increase in soil erosion and loss with mastication treatments (Hachett et al., 2006). Grapple piling would decrease soil cover but soil cover would remain over 35 percent with design criteria applied. Grapple piling removes coarse woody material and high fuel loadings (which have potential to detrimentally impact soils when burning is uncontrolled) but does not remove fine woody or litter/duff layer, which is the substantial portion of soil cover.

Nutrient cycling, filtering and buffering, and carbon storage

In areas of mastication treatment, soil cover would be dramatically increased. Treatment would result in lower soil temperatures and increased soil moisture later in the growing season (Kobziar and Stephens, 2006), both positive effects for soil productivity. Over the long term, mastication treatments would increase soil organic matter through leaching of soluble organic compounds and eventual decomposition and incorporation of masticated materials into the soil profile. Grapple piling would reduce coarse woody material, but not below design criteria. Precommercial thinning and timber stand improvements including whip falling and tree planting completed by hand crews would not have detrimental effects to soil productivity or soil quality.

The Effects of Prescribed Fire

Slope stability

Prescribed fire is not expected to influence slope stability. Fires are prescribed at low to moderate severities, tree mortality and enhanced soil moisture from reduced vegetation is not expected to increase soil moisture to a degree at which the potential for landslides/debris flows is increased. Tree mortality would also not be substantial enough to affect root structure across the landscape. Understory vegetation recovery would support slope stability.

Soil hydrologic function

Prescribed fire is not expected to create expansive areas of hydrophobic conditions in soil (Robichaud, 2000). Monitoring of six prescribed fires in 2013 on the Colville National Forest (Kollen and Jimenez, 2013; Totman and Jimenez, 2013), did not find the presence of soil hydrophobic layers or other significant changes in soil hydrologic function. Soil cover as well as litter and duff layers are not disturbed to an extent that would create substantial soil erosion. Localized erosion has been observed but in areas less than 100 square feet and would not be classified as detrimental to soil productivity. Prescribed burning would not increase soil erosion and loss over the short term (Elliot, 2005).

Nutrient cycling, filtering and buffering, and carbon storage

Soil nutrient status would be increased and soil acidity decreased, both positive effects. Approximately 10 percent of soil nitrogen would be lost through prescribed fire; research has shown no substantial impact to forest productivity with these losses from prescribed fire (Johnson et al., 2005). There would be a short-term reduction of soil organic matter, approximately 5 percent decrease (Johnson and Curtis, 2001). This short-term reduction is within Soil Quality Analysis Standards and would have no effect on long-term soil productivity and soil quality. Over the long term, prescribed fire would increase soil organic matter and nutrient cycling over pre-fire levels (Certini, 2005).

Detrimental Soil Conditions

Table 14. Acres of Soil Impacted

Activity	Approximate Area Impacted
New construction of specified roads	no measurable increase
Temporary roads	27 acres
Decommission of existing roads	decrease of detrimental soil conditions
Landings	100 acres
Rock pits	5 acres

Effects of roads, landings, and rock pits

Regardless of soil type and site conditions, detrimental soil compaction and displacement always occurs on roads and landings. The construction of roads and landings is considered a long-term effect on soil productivity. Roads and landings can be obliterated and some productivity restored; however, full productivity would not be restored until organic matter is restored and soil structure has developed. Approximately 9 miles of temporary roads and approximately 100 new landings are proposed with this alternative. About 5 acres would be disturbed for use as a borrow pit. The proposal would decommission up to approximately 7 miles of specified NFS roads. Soil quality and soil productivity would be impaired for the long term on these acres.

These features would be on the landscape for many decades before recovery to background conditions.

The effects of timber removal

The proposed action would increase detrimental soil conditions 6 percent to 12 percent on approximately 5,000 acres. These acres, bounded by the harvest unit, would remain within regional and forest plan soil quality standards. Recovery of soil conditions would occur in the short and long term.

Fuels Treatments and Pre-Commercial thinning

The proposed action would increase detrimental soil conditions 1 percent to 3 percent on approximately 500 acres. These acres bounded by the treatment unit would remain under regional and forest plan soil quality standards. recovery of soil conditions would occur in the short term.

Prescribed fire

Monitoring of seven prescribed fires in 2013 (Kollen and Jimenez, 2013; Totman and Jimenez, 2013) show less than two percent detrimental soil conditions. High soil burn severity is typically less than 1 percent of measured transects and does not represent a threat to soil productivity or soil quality. Existing roads and natural features are typically used as control lines and well as hand line. Hand line is typically less than a three-foot scrape and represents less than 0.1 percent of the unit. Water control structures would be installed on hand line to prevent soil erosion.

The proposed action would increase detrimental soil conditions 1 percent on approximately 700 acres. These acres bounded by the treatment unit would remain under regional and forest plan soil quality standards. Recovery of soil conditions would occur in the short term.

New road construction and reconstruction

Construction of Specified Roads: Option #1 proposes approximately 2.7 miles of road construction to relocate a portion of the Rocky Creek Road (4699). Approximately 2.1 miles of road is proposed for obliteration to remove the portion of Rocky Creek Road that has the potential to discharge sediment and negatively influence the adjacent stream. Although an additional 0.6 miles of road would be present on the landscape, the benefit to watershed and fisheries values is much greater with the proposed relocation and realignment of the road. Soil productivity would be reduced on the 0.6 miles of additional road bed, but overall watershed values would be improved.

Option #2 proposes to replace three deficient bridges on the Rocky Creek Road. Effects to soil productivity and soil quality would be minimal due to the use of a previously disturbed site. With additional impacts from construction and possible expansion of the bridge footprints, effects to the soil resource would be minimal. Soil Quality Standards and Guidelines do not apply to construction projects. Best management practices would be used to minimize potential soil erosion.

Alternative B proposes to replace 16 culverts on fish-bearing and non-fish-bearing streams. Best management practices would be used to minimize potential soil erosion. No measurable increase in detrimental soil conditions would occur. Replacement of culverts would improve watershed values as a whole.

The proposed action would reconstruct approximately 32 miles of road. No measurable increase in detrimental soil conditions would occur. Soil quality and productivity are protected when roads are maintained.

Cumulative Effects

The analysis area for cumulative effects to soils is the treatment unit or activity area. The activity area is defined in Region 6 Soil Quality Standards as "The total area of ground impacting activity, and is a feasible unit for sampling and evaluating." The effects of past, present, and reasonably foreseeable future actions to soils typically involve the area of disturbance itself and does not move outside the area disturbed.

Disturbance to soil can last for decades and even centuries (Amundson and Jenny, 1997; Jenny, 1941). For reasonably foreseeable future actions, the bounding is five years in the future. No additional projects and treatments, in addition to the proposed action, are anticipated within the activity areas. Continued cattle grazing, road maintenance, special use by the Air Force Survival School, and recreational activities are anticipated to be the reasonably foreseeable future events.

In this analysis area, compaction from past logging and homestead activity is the most common type of existing detrimental soil condition found in proposed harvest units. Other activities that could affect compaction include cattle and recreation use (including firewood cutting).

There are no other activities in the reasonably foreseeable future (defined for this analysis as five years) that are expected to substantially increase the detrimental soil condition in the project area. There are no quantifiable cumulative effects as a result of the proposed action.

Forest Plan Consistency

With implementation of applicable design criteria, best management practices, Regional Soil Quality Standards and Guidelines, and Colville National Forest Plan Standards, overall soil productivity and soil quality would not be detrimentally impacted by the proposed action. This is the same for both proposed option #1 and option #2 for Rocky Creek Road (4699).

The proposed action would meet soil management goals, maintenance of soil quality, and limit of detrimental soil condition. The proposed project action complies with the standards and guidelines described in the Forest Service Manual and Handbook, General Water Quality - Best Management Practices – Pacific Northwest Region (1988), Region 6 Soil Quality Standards (1999), and Colville National Forest – Land Management Plan (1988).

Transportation

Information provided in this Environmental Assessment about transportation is excerpted from the Renshaw Transportation Analysis Report by Civil Engineer Lucy Reeves (July 2014). The full report is available in the project analysis files.

Forest Service Manual (FSM) 7710.3 requires that travel management decisions are based on current scientific data, Travel Analysis Process (TAP), such as that described in Forest Service Handbook (FSH) 7709.55, Chapter 20. The Travel Analysis Process is intended to identify 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.

This travel analysis was initiated for the Renshaw project area in October 2012. It was tailored to the Renshaw project area's local situation and landscape/site conditions as identified by the interdisciplinary team, coupled with past public input and collaboration, and was completed in spring 2014. The interdisciplinary team identified opportunities from this Travel Analysis to analyze specific resources for this environmental assessment. The full Travel Analysis Report is in the project files, and incorporated here by reference.

Figure 7. Heading west from Hwy 20 on Rocky Creek Road.

Affected Environment

County Road 4699/FS Road 7018000 (Rocky Creek Road) and County Road 2625 (Hanks Butte Road) provide the main stem access to the project area. The Rocky Creek Road west of the junction with Forest Road (FR) 7018550 has a fairly rough surface due to drainage issues. There are approximately 41 miles of existing roads in the Renshaw analysis area. Roads by jurisdiction are shown in the following table.

Table 15. Roads by Jurisdiction within the Renshaw Analysis Area

Jurisdiction	Length (miles)	Percent of Total
State	2.7	7%
County	8.5	21%
Private	0.30	<1%
USFS	29.2	72%
Total	**40.7**	**100%**

County Road 4699 (Rocky Creek Road) has been closed at a road stream crossing due to a deficient bridge in T. 37 N., R. 42 E., section 28, NW ¼. Another county bridge just to the east of the closed bridge is also deficient to the extent in which Pend Oreille County has load restricted. These bridges would need to be repaired or replaced to ensure safe travel and haul across them for the Renshaw project implementation. Pend Oreille County has planned to vacate their easement on Rocky Creek Road from Hwy 20 to the west edge of section 30, T. 37 N., R. 42 E. Because the road is on Forest Service lands, by default the road would fall under jurisdiction of the Forest Service.

Direct and Indirect Effects of Alternative A

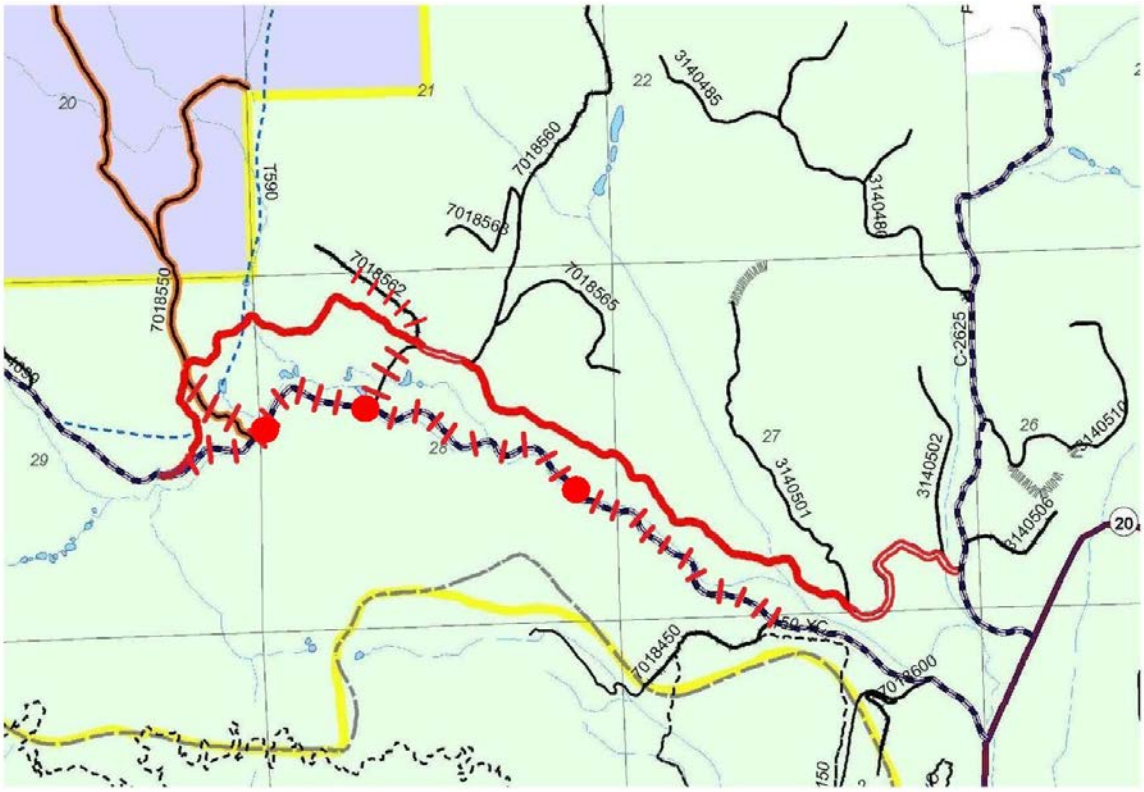
Under the No Action alternative, there would be no change from the current condition. There would be no roads added to or decommissioned from the Forest transportation system and planned road maintenance and management activities would continue. Under No Action, County Road 4699 (Rocky Creek Road) would remain closed with deficient bridges limiting access to the area.

Direct and Indirect Effects of Alternative B

This alternative includes approximately 10 miles of temporary road. A temporary road is a road primarily constructed for the sole purpose of accessing and harvesting a commercial sale area. The intent of these roads is for short-term use only. Temporary roads would be effectively rehabilitated and re-vegetated within 10 years of contract completion. This alternative also includes the construction of up to approximately 3 miles of new National Forest System roads, reconstruction of approximately 33 miles of National Forest System roads, and decommissioning of up to approximately 7 miles of NFS roads.

The interdisciplinary team identified two options to analyze in order to obtain access to the Renshaw project area by way of County Road 4699 (Rocky Creek Road) that is currently closed due to deficient bridges.

Figure 8. Rocky Creek Road Options



Option 1: Proposed Rocky Creek Relocation (New Construction)

Option 1: Proposed Rocky Creek Relocation (Reconstruction – upgrade to ML3 std)

Option 1: Proposed Decommissioning

Option 2: Replace Existing Bridges

Option 1: Relocate a portion of the Rocky Creek road out of the riparian area to the north of Lost Creek to bypass the deficient bridges. This option decommissions roughly the same amount of road (including redundant spur roads) as being newly constructed resulting in no net increase of system roads with this relocation. The relocation also utilizes 2 existing roads. The cost of maintaining the new road is anticipated to be less than the existing Rocky Creek road because it would be constructed outside the riparian area.

Option 2: Restore access to the existing Rocky Creek road by replacing the deficient bridges. The three bridges located on the existing Rocky Creek road are treated timber bridges with post and sill abutment construction that were built in 1958 and are reaching the end of their expected life span (60 to 70 years). Upon inspection of the bridges from Pend Oreille County, the western most bridge was closed and the eastern most bridge was load restricted to 12,000 lbs. gross vehicle weight due to deficiencies. The bridge between the two remains unrestricted.

Because these bridges do not meet current standards, and the extent of repairs would include replacing the entire abutment(s), curbs, and possibly the decks, the proposal is to replace the bridges rather than repair them. It is anticipated that in the next 10 years even the bridge that is currently unrestricted would need to be replaced, and thus the replacement of all three bridges is being analyzed rather than just the two.

With Option 2, the three bridges would be added to the Forest Service inventory and the Forest Service would be responsible for inspection and maintenance of these bridges as well as the maintenance of a road within a riparian area.

DNR Access

Due to Pend Oreille County vacating their easement on the proposed portion of the Rocky Creek road, Washington Department of Natural Resources (DNR)'s access to a portion of their land north of the Renshaw Vegetation Management Project would be affected. DNR currently has legal access from the south on the existing Rocky Creek road as well as on the 7018550 cost share road to access their land north of the project area. DNR recently complete a timber harvest project in that area and constructed new access to their lands from the north in order to bypass the deficient bridges. The Forest Service would need to confirm if DNR would like to maintain their access from the south. If DNR would like to maintain their access from the south, the following course of action would likely be taken:

When the County vacates the road, the Forest Service would likely grant DNR an easement because of their existing rights on the road.

For **Option 1:** If the Forest Service decides to relocate a portion of the Rocky Creek road out of the riparian area to the north of Lost Creek to bypass the deficient bridges, then the Forest Service would be obligated to ask DNR if they want rights either on the existing Rocky Creek Road (non-cost share) or to buy into the proposed road.

For **Option 2:** If the Forest Service decides to restore access to the existing Rocky Creek road by replacing the deficient bridges, DNR can be asked for their share and approval in replacing those bridges.

If DNR does not want access rights from the south, then the Forest Service can terminate DNR's rights on the 7018550 and proceed as the Forest desires.

Access to the South of Lost Creek

Long-term access to the area south of Lost Creek is currently limited. With the Renshaw Vegetation Management Project, Forest Lands to the south of Lost Creek are proposed to be accessed by means of temporary roads for the purposes of the project. The option of relocating the road even further limits access (even temporary access) to the area south of Lost Creek. A Forest Service System road, approximately 2.5 miles long, could be constructed in lieu of the temporary roads to provide long-term access to approximately 1,600 acres of Forest Service land in management areas 5 and 7.

Cumulative Effects

Existing uses such as recreation and grazing would continue. Cumulative effects of proposed temporary and re-constructed roads are discussed under fisheries, hydrology, and soils resource sections. Alternative B would meet Forest Plan direction for transportation management.

Recreation

Information provided in this Environmental Assessment about recreation is excerpted from the Renshaw Recreation Report by Recreation Specialist Kevin Walton (July 2014). The full report is available in the project analysis files.

Affected Environment

Recreation activities in the Renshaw analysis area include dispersed camping, Off-Highway Vehicle (OHV) use, hiking, and snowmobiling. Other activities include wildlife viewing, cross-country skiing, snowshoeing, berry picking, geocaching, fishing, wading, and hunting. The landscape is heavily roaded and modified due to its history of homesteading and timber management. The analysis area is one of the lower recreation use areas on the Newport and Sullivan Lake Ranger District during the summer season. However, snowmobiling is very popular during the winter season. An area commonly referred to as the Little Pend Oreille (LPO) recreation area is immediately adjacent to the project area on the Three Rivers Ranger District and receives moderate recreation use year-round. The LPO encompasses Frater Lake, Lake Leo, Lake Thomas, and Gillette Lake and includes three popular developed campgrounds, a developed day use site, and numerous miles of non-motorized trails, motorized single track, ATV trails, groomed non-motorized winter trails, and groomed snowmobile trails. There are also numerous miles of DNR and County roads in the area designated for OHVs.

Figure 9. Dispersed campsite within the Renshaw project area.

A total of 21 dispersed campsites were inventoried within the project area boundary in November 2012. Dispersed campsites were categorized as significant or minor based on the amount of use the site receives. Twelve of the sites identified were categorized as significant.

Direct and Indirect Effects of Alternative A

Dispersed Recreation

No immediate change would occur in the quality of the dispersed recreation opportunities in the Renshaw project area if the proposed action is not implemented. The availability of dispersed camping opportunities would remain the same and the setting in which those opportunities exist would remain reasonably unaltered in the immediate future. The availability of other recreation opportunities would also remain the same and the setting in which those opportunities exist would remain unaltered in the immediate future. However, the lack of stand treatments may lead to decreased forest health, thus, resulting in a loss of scenic quality, shade, berries, and hunting grounds in the long-term. Access to two campsites north of Frater Lake would remain unchanged. Existing and continued resource damage at these two sites would also remain unchanged. Miles of roads open to hunting and other recreation uses would remain unchanged from current conditions.

Trails and Off Highway Vehicle (OHV) Recreation

No immediate change would occur in the quality of the riding experience on the ATV or single track trails if the proposed action is not implemented. The availability of motorized and non-motorized trail opportunities would remain the same and the setting in which those opportunities exist would remain reasonably unaltered in the long-term. No action may lead to an increased potential for stand mortality and erosion from failing culverts. This may result in additional windfalls, hazard trees, and erosion problems along the trails and would have an adverse effect on recreation use within the project area.

No immediate change would occur in the quality of the experience along roads open to OHVs in the RPA if the proposed action is not implemented. The availability of legal OHV riding opportunities (as identified on the Colville National Forest Motor Vehicle Use Map) would remain the same and the setting in which those opportunities exist would remain relatively unaltered in the foreseeable future. Existing levels of legal and illegal OHV use would continue to fluctuate based on external factors such as the economy, population growth/decline, and fuel prices.

Winter Recreation

No immediate change would occur in the quality of the trail experience on the designated snowmobile trail systems if the proposed action is not implemented. The availability of motorized and non-motorized trail opportunities would remain the same and the setting in which those opportunities exist would remain reasonably unaltered in the immediate future. However, the lack of treatment within the timber stands has the potential to diminish scenic quality as well as the winter recreation experience if forest health declines. Additionally, loss of meadows from conifer encroachment could reduce available open snowmobile riding areas.

Rocky Creek Road

Currently, access to significant dispersed campsites and trail #151 is limited to the west end of the road. Not repairing or relocating the road would continue to restrict access to those coming from the Pend Oreille County side. In addition, this road is part of a long distance winter snowmobile

route maintained by Washington State Parks under grant and Sno-Park funding. Not repairing or relocating this route would likely close the route to winter use as well. This would close an important connecting piece of the trail system. It would also likely reduce future grant funding opportunities for the Frater Lake winter trail system.

Direct, Indirect, and Cumulative Effects of Alternative B

Dispersed Recreation

Impacts to camping, fishing, swimming, picnicking, berry picking, hunting, sightseeing, hiking, stock use, mountain biking, geocaching and other dispersed recreation opportunities could occur where harvest and burn activities are proposed. The majority of these impacts would be short-term.

Short-term impacts would include dust, noise, smoke, congestion from additional commercial traffic, temporary loss of access to favorite hunting, fishing, and berry picking areas, and possibly road closures. Berry picking, hunting, and wildlife viewing may improve after overstory and understory vegetation is removed. Other short-term impacts include temporary loss of access to some existing dispersed campsites within the RPA. Since not all units would be harvested at the same time, access to dispersed camping in general would be minimally affected. In addition, the area has inventoried dispersed campsites that are not in management units that would remain available to campers. Work within or adjacent to dispersed camping sites during the primary recreation and hunting season (Memorial Day through November) could impact users through congestion, commercial vehicle traffic, noise, dust, and smoke. In most cases, terrain features and existing vegetation surrounding campsites would reduce these impacts. Safety concerns associated with increased traffic would likely be mitigated with standard signing typically used for harvest and haul traffic activities.

Long-term impacts would include loss of vegetation and screening surrounding dispersed campsites, through either harvest or burning. Dispersed campsites may also be impacted for several years if used as a landing due to potential compaction, loss of ground vegetation, expansion of the site, scarring of surrounding trees, loss of shade, slash accumulation and scarring from pile burning. Upon completion of stand treatments, the availability of new dispersed campsites could increase within the project area as a result of openings created through thinning, ladder fuel reduction, and fuel breaks.

The proposed closure of 0.4 miles of FS Road 7018600 would eliminate vehicle access to two dispersed campsites. Motorized users of these sites would likely be displaced to other sites nearby. In addition, the potential for new sites to be created in the vicinity (from landings and other openings created during vegetation treatments) may offset the displaced use. The road would remain open to non-motorized use. Closing these sites to motorized use would help sanitation problems and adverse impacts to the resources from illegal OHV use.

The proposed closure of FS Road 7018503 would have little effect on camping and hiking use since it does not access any campsites or trails and is currently not drivable. The effects of closing FS Roads 7018565 and 7018568 would result in the loss of motorized access for some hunters and other forest users. These roads are short, dead end spurs located in the Rocky Creek drainage which is part of the Little Pend Oreille Lakes Recreation Area. Closing these roads would help improve wildlife habitat and hunting opportunities for non-motorized users. All three roads are closed to OHV use and no significant dispersed campsites are accessed by any of these roads.

Motorized Trails and Roads open to OHVs

Converting OHV trails to haul routes would alter the riding experience by increasing the width of the route and travel speed. Treatments along or across trails could result in increased trail maintenance needs by opening up remaining stands to higher wind throw potential. In addition, creating openings along trails and OHV roads with skid trails or harvest could result in increased illegal user-created routes and reduce the visual quality of the these routes. Furthermore, erosion could increase along trails if canopy cover is reduced and may have an adverse effect on recreationists due to lack of quality trails. Boundary and leave tree markings along these routes could adversely impact the visual quality of the route.

Nonmotorized Trails

Trails around Frater Lake are popular year-round for hikers, bikers, and cross-country skiers due to the scenery and wildlife viewing opportunities. Tree marking, skid trails, haul routes, and harvest units within view of these trails would adversely alter the trail experience for many years. In the winter, these trails are operated by Washington State Parks under the Sno-Park pass. Damage to trail values in this area could result in a loss of revenue and future grant funding for grooming these routes.

Winter Recreation

Winter recreation opportunities within the project area may have an adverse effect due to proposed harvest activities along groomed snowmobile routes. Plowing and hauling on groomed routes would reduce the number of miles available to the public by reducing the viability of the route. The majority of winter use is snowmobiling and cross-country skiing on groomed routes operated through Washington State Parks. Winter harvesting and hauling on these routes could reduce the quality and availability of winter recreation experiences in those areas, thus impacting the State operated program. Cross-country travel access may improve as a result of opening up stands and reducing understory through burning. Short and long-term adverse impacts from harvesting operations could result in a loss of revenue for the state program and possibly reduce or eliminate grant funding opportunities for grooming these trails in the future.

Rocky Creek Road

Option #1: Relocating Rocky Creek Road (C4699) to the proposed north route would provide better access to the 151 OHV trail and dispersed campsites west of the proposed rerouted section. There are no significant dispersed campsites or trails within the proposed relocation portion of the road. Decommissioning the existing route should have little or no effect on recreation in this area. Mixed use of the road (i.e. all vehicle types allowed including OHV and winter uses) would remain the same on the new relocated road.

Option #2: Repairing the existing bridges on Rocky Creek Road would reopen the route to OHVs. Repairing the road would also improve access to dispersed campsites west of the current closure and improve access to the 151 OHV trail.

Cumulative Effects

Proposed and ongoing projects with potential cumulative effects overlap in time and space. However, there are no known past, present, or reasonably foreseeable future projects that are anticipated to have effects which will overlap within the space of the Renshaw project area. Projects that overlap in time include the proposed Timber Mountain Vegetation Management Project and the ongoing Power Lake Vegetation Management Project.

The Power Lake project is ongoing and effects to recreationists have been minimal. One of the main recreation effects from the Power Lake is the relocation of a portion of the Middle Fork Calispell county road (2022). The closure of this portion of road will close access to several popular dispersed campsites and complaints from the public have been received about this scheduled closure. However, relocation of the Rocky Creek Road would not close access to any significant dispersed campsites and is not anticipated to have any cumulative effects on the Renshaw project.

The temporary loss of dispersed campsites is not anticipated to be cumulative amongst all three projects as each area is expected to absorb displaced use within its own project boundary. This has been demonstrated in the Power Lake area as very few complaints have been received about the temporary closures and use has not increased noticeably in other locations as a result of the closures. The Renshaw and Timber Mtn. areas have fewer sites with lower use rates than Power Lake so it is not anticipated displacement from temporary closures would have cumulative effects.

Hunters could be temporarily displaced by noise, increased traffic, and temporary area closures within all three project areas at the same time. However, these closures are expected to be relatively small and isolated within each boundary area and are not anticipated to displace hunters to surrounding areas or have a cumulative effect.

Winter use, particularly over-the-snow vehicle use, would likely be the most impacted by the cumulative effects of all three projects. All three areas have groomed snowmobile winter routes proposed for use as winter haul routes. Users displaced by closures in the Power Lake area have been encouraged to use other routes including those in the Timber Mtn. and Renshaw areas. If route closures occur in all three areas at the same time, users may not have adequate alternatives for riding. However, the forest has been working collaboratively with local snowmobile groups and organizations over the past couple years to develop strategies to mitigate these impacts. As a result of these efforts, is anticipated the effects can be mitigated to acceptable levels by alternating route closures, potentially providing alternative routes, and properly notifying riders prior to closures.

There are no known or anticipated cumulative effects from past, present, or reasonably foreseeable projects on non-forest system land adjacent to the project area.

Forest Plan Consistency

Activities proposed with the Renshaw Vegetation Management Project would meet Forest Plan Standards and Guidelines for dispersed recreation, trails, and winter recreation.

Scenery Management

Information provided in this Environmental Assessment about scenery is excerpted from the Renshaw Scenery Analysis Report by former Landscape Architect Vaughn Hintze and Presale Forestry Technician Lindsay Lockard (July 2014). The full report is available in the project analysis files. The project area is valued as a scenic experience and setting for those people living or recreating in and around the area. The landscape is also viewed briefly as visitors travel along State highways, and local County roads surrounding the area. Views from within the analysis area are of distant drainages and rolling mountains.

The Colville National Forest manages visual resources according to Visual Quality Objectives developed through the Visual Management System (USDA Forest Service 1974), and further specified in the Forest Plan (1988), which allocates management areas that guide resource management activities on National Forest System Lands. The Visual Management System was updated by the Landscape Aesthetics, A Handbook for Scenery Management (USDA Forest Service 1995), and otherwise known as the Scenery Management System (SMS). The Colville National Forest utilizes the concepts within the SMS process during area analysis, and would fully implement the process upon approval of the Colville National Forest Plan revision.

Figure 10. Autumn in the Renshaw project area, looking toward the Pend Oreille River

The existing visual condition of the Renshaw project area ranges from a landscape where changes are not visually evident to the average person unless pointed out, to landscapes where changes are easily noticed and may attract some attention. The changes appear to be disturbances, but they resemble natural patterns.

Direct and Indirect Effects of Alternative A

No immediate change would occur in the quality of the scenic resource. However, while no proposed activities would occur in this alternative and no immediate change in landscape appearance would ensue, implementation of this alternative would result in the deferral of activities designed to improve: the resiliency of the landscape, the scenic diversity, the sustained, long term scenic quality and enhance the beauty of the area. Also, if overstocked stands remain untreated, in time these stands would become susceptible to insect/disease and stand-replacing fire, thus reducing the scenic integrity of the area.

Direct and Indirect Effects of Alternative B

Road Construction/Reconstruction Activities

Road Construction/Reconstruction Options 1 and 2: If all proposed light and medium road reconstruction activities are completed, they are expected to meet Forest Plan standards for visual quality. There would be some limited short term and minor in scope impacts while immediate vegetation (grasses and other herbaceous materials) populates the cut and fill slopes, ditches, etc.

Road Construction/Reconstruction Option 1 (post -project): If relocation of Rocky Creek Road and decommissioning of a portion of the existing Rocky Creek Road are completed, they are expected to meet Forest Plan standards for visual quality. There would be some immediately noticeable impacts, but with reasonable vegetative recovery durations the proposed actions would not only meet the Forest Plan directed visual quality objectives (VQOs) of Retention, Partial Retention, and Modification, but are expected to result in a long-term landscape enhancement.

Road Reconstruction Option 2: If this option were chosen, only potential short term visual impacts would occur during reconstruction of road and replacement of bridges. After the reconstruction is complete, there would be no adverse impacts to visual quality.

Timber Harvest Activities

The following activities/treatments would meet their respective Retention, Partial Retention and Modification VQOs (as seen from critical viewpoints discussed in the existing condition section): Commercial Thinning; Precommercial Thinning; and Prescribed Fire. These activities retain the mature forest canopy as seen in middleground or background with only textural changes in the canopy, thus allowing them to meet respective VQOs. The proposed logging system is tractor, which would create no negative impacts when project design criteria are followed.

In Selection Harvest, Group Selection Harvest, and Special Cut areas which have portions located in the immediate foreground and foreground of Nile Lake, State Highway20, and County Route 4699, the forest canopy may be altered considerably. Many of these stands include lodgepole pine that are in decline and would benefit from treatment. There is an expectation that there may be a minor amount of short-term (one to a few years) visual impacts reducing the Visual Condition of various small portions of the Forest below VQOs. However, the planned activities are anticipated to achieve long term desired conditions and scenic enhancement.

With reasonable vegetative recovery durations, Alternative B would not only meet the Forest Plan directed VQOs of retention, partial retention, and modification, but are expected to result in a long-term viewshed/landscape enhancement. Timber cutting and fuels treatment would be seen as a textural change in the forest canopy with openings in scale with natural patterns. With the proposed treatments of the units which are declining stands (dead and dying trees or under-stocked need to be part of any vegetation treatment), the effects would be beneficial to the landscape.

The retention of larger trees (over 21” DBH), large bole Ponderosa Pine, Western Larch and White Pine would continue to be a highly valued scenery component and would enhance the diversity. With thinning activities and the retention of large trees, open stands would allow enhanced “visual penetration” of the forested landscape. With the removal of small trees and brushy growth/debris around these larger trees featuring the remaining highlighted, larger trees, the overall viewshed would be enhanced thus a positive effect in the short and long term.

Fuels Treatment Activities

Prescribed fire areas would meet VQOs as overstory trees would screen middleground and background views of blackened ground surfaces; green-up would occur the following spring. Underburning would blacken tree trunks, low branches, and the ground. The effect can be highly visible immediately following the burn, but the effect would become less as scorched foliage drops and under story vegetation becomes re-established. The visual effects of underburning are usually minimal to the casual observer in five years or less. Hanging “orange-red” dead conifer needles due to some inherent scorching can be considered a visual impact by some. This is a short-term duration result; normally the needles fall within one season. To some extent, dead needles can be considered to mimic the naturally occurring dead and dying conifers due to drought and pest effects which add to the scenic complexity and diversity of the broad scale Forest landscape. As the viewing distance increases, the visual effects become less evident. From the middle ground viewing distance, it may be possible to see some widely scattered black or “orange-red” tree crowns; the result of trees that torched or became excessively heated/scorched

from the proposed burning. From the background viewing distance, little to no visual effect should be discernable.

Cumulative Effects

Existing management activities such as road maintenance and cattle grazing would continue. Planned fuel management actions in the next 3-7 years should reduce the risk and intensity of future wildfires, and vegetative and visual diversity would be maintained and enhanced across the project area. Reasonably foreseeable actions such as noxious weed treatments, road closure management, aspen restoration efforts, and the removal of encroaching conifers within meadows happening in the next 3-10 years would not affect visual characteristics within the analysis area and would work to retain the valued landscape character. Activities visible on privately owned land would continue to be part of the travelers' view within the area; however since private lands comprise a minimal portion of the area, no cumulative or additive effects are expected. Activities that treat vegetation proposed in the next 3-10 years at the landscape scale, without the introduction of long-term negative visual elements, would not take away from the positive attributes of the landscape character of National Forest Lands.

Forest Plan Consistency

The Renshaw Vegetation Management Project, with the design criteria provided, meets the Forest Plan Standards and Guidelines for Scenery Management.

Cultural Resources

Information provided in this Environmental Assessment about cultural resources is excerpted from the Renshaw Heritage Resources Report by Archaeologist Alicia Beat (July 2014). The full report is available in the project analysis files.

Affected Environment

There have been no previous cultural resource inventories completed within the Renshaw project area. However there are 22 known sites present within the analysis area. Past management practices have determined 1 site as Not Eligible to the National Register of Historic Places (NRHP) and 21 sites are unevaluated for eligibility to the NRHP. Historic properties that are unevaluated are managed as if eligible, and mitigations for these properties will follow management prescriptions. Currently Heritage Program management attempts to relocate sites, monitor the sites for damage/deterioration, evaluate the sites for NRHP eligibility, and preserve/protect the sites.

Direct and Indirect Effects of Alternative A

There would be no change from the current condition. Heritage sites would continue to gradually deteriorate over time; subject primarily to natural forces (i.e. weather conditions, unexpected wildfire, etc.). Cattle grazing and recreationists would still have the potential to effect sites through destruction and/or alteration. Natural forces could destroy or substantially damage standing or downed historical structures, affecting potential National Register eligibility characteristics of these properties.

Direct and Indirect Effects of Alternative B

Project activities have the potential to damage or destroy these sites directly by heavy machinery, falling trees, road building, fuels treatments, etc., or indirectly as a result of discovery through increased access to each site. Additionally the removal of natural barriers may allow cattle access

to historic properties, which could increase the likelihood of damage due to cattle behavior and movement.

Hazardous fuels reduction can have a beneficial effect on historic properties with regard to the decrease in potential for uncontrolled wildland fire. Uncontrolled wildland fire would completely destroy many of the historic properties that exist within the project area. A reduction in fuels would mitigate this potential occurrence.

Road construction activities have the potential to damage or destroy these sites directly by heavy machinery and road building activities or indirectly as a result of discovery through increased access to the sites. Development of existing gravel/source material pits would have no effect on cultural resources as these locations have been previously cleared for cultural concerns. Decommissioning of roads could have a beneficial effect on historic properties as it has the potential to reduce access to areas, which may contain Historic properties thereby reducing the possibility of damage, destruction, and looting by the public.

Option 1: The Rocky Creek relocation is within approximately 1,000 feet of a cultural property. While the project is not likely to affect the site, care must be taken when in the vicinity of the site so not to inadvertently damage the site or its contributing features. Additional screening may be required to protect the site from view. The Rocky Creek Road obliteration post-project is not located near any known cultural resources but the Lost Creek Bridges would have a determination eligibility completed prior to removal. The de-compaction and subsequent contouring would have no effect on historic properties.

Option 2: If the current Rocky Creek Road is restored the Lost Creek bridges, which have not been evaluated for eligibility, would have a determination of eligibility completed prior to replacement.

Cumulative Effects

Past management practices within the analysis area include vegetation management, fire/fuels, road construction, recreation management, fisheries and wildlife improvement, and range management. Foreseeable future management practices would likely include the same types of actions.

Effects of past management practices are likely to have some effect on historic properties, mostly due to the aggressive fire suppression, historic fire patterns, and the continued buildup of fuels. This buildup of fuels has the potential to affect historic properties through stand-replacing wildland fire. The effects of an unplanned fire within the project area would be immediate (1-5 years) and most likely devastating, since many of our historic properties are constructed from wood. If the historic property survives an unplanned fire, the vegetation that once protected it from discovery by recreationists and shielded it from grazing cattle would be lost or severely modified; which may lead to destruction or deterioration of the property.

Cumulative effects of foreseeable future management practices would likely be beneficial to the protection of historic properties in that the cultural resource program will be involved in providing input to line officers regarding future practices that should allow for added protection. None of the proposed actions for this project would consist of negative cumulative effects to historic properties.

Forest Plan Consistency

The Renshaw Vegetation Management Project, with the design criteria provided, meets the Forest Plan Standards and Guidelines for Cultural Resources item 2 page 4-37 and Federal regulations concerning Heritage Properties (National Historic Preservation Act and its implementing regulations at 36CFR800). Monitoring and maintenance of these sites would continue through the Heritage Program's standard program of work.

Congressionally Designated Areas, Unique Ecosystems

The Renshaw analysis area does not contain, nor is it within an influence zone for, any existing or proposed wilderness, wilderness study area, wild and scenic river area, national recreation area, research natural area, Forest Plan designated roadless area, inventoried roadless area, or municipal watershed. There are no unique ecosystems within the analysis area.

The analysis area overlaps a portion of the project area the public identified as special near Lost Creek. Homesteading in the Lost Creek area began in the late 1800s. Large-scale timber harvest began with the advent of the rail line in the early 1900s. Large fires followed in the slash created from logging. Large fires in the watershed are recorded between 1916 and 1931. By the 1930s, logging was an activity of the past. Hillsides were either burned or covered with brush.

This area the public identified as special near Lost Creek has not been recommended for wilderness designation or for any other type of management at this time. The ID team originally proposed some commercial treatments within the area, but during discussions with the collaborative group it was decided that only noncommercial treatments would be considered at this time. Alternative B does not propose any commercial treatments or road construction within this area. However, nonmechanical underburn treatments are included in the proposed action. The area the public identified as special near Lost Creek would continue to meet the criteria for being eligible for evaluation for placement on the potential wilderness inventory during the forest plan revision process (Forest Service Handbook 1909.12, chapters 71.1 and 71.11.)

Air Quality

Information provided in this Environmental Assessment about air quality is excerpted from the Renshaw Fire/Fuels and Air Quality Report by Assistant Fire Management Officer Brian Hicks (July 2014). The full report is available in the project analysis files.

Affected Environment

The Renshaw analysis area is within a designated Class II airshed. Smoke originating within and/or potentially impacting this airshed is regulated by the Washington Department of Natural Resources – Smoke Management Division (WA DNR).

Direct and Indirect Effects of Alternative A

The activities associated with this alternative would have no immediate adverse impacts to air quality. The existing sources of particulate emissions within and/or near the Renshaw analysis area include smoke from neighboring prescribed fire projects including, but not limited to, forest residue burning on National Forest System (NFS) and non-NFS ownerships; smoke from residential wood stoves and agricultural activities in the Pend Oreille valley (Cusick, Usk, Blueslide, Tiger, Ione, Metaline Falls, etc.); and vehicular dust and exhaust.

The potential for substantial air quality degradation would increase in the long-term under this alternative. Without vegetative and surface fuel treatments designed to mimic the historical fire

regimes, the trend may be for a large portion of the Renshaw landscape to be at high risk to uncharacteristically severe wildfires. Consumption of relatively high levels of surface fuels and forest biomass during severe wildfire events could produce smoke and CO2 emissions far greater and longer than historical norms (Huff et al. 1995).

Direct and Indirect Effects of Alternative B

The potential for smoke intrusion into a non-attainment area or Class I airshed from proposed activities would be negligible due to distance and the prevailing southwest winds. Class I airsheds that are relatively close to the Renshaw Analysis area include the Cabinet Wilderness, located approximately 90 miles to the east, and the Spokane Indian Reservation, 105 miles to the southwest. Smoke and other airborne particulates originating from proposed activities within the Renshaw Analysis area would normally be carried to the northeast, away from Class I airsheds and non-attainment areas.

Smoke from prescribed fire activities may temporarily degrade air quality within the Renshaw Analysis area and nearby Pend Oreille River valley (Cusick, Usk, Blueslide, Tiger, Ione, Metaline Falls, etc.). In comparison to scheduled ignitions, unplanned ignitions (i.e. wildfires) can result in smoke emissions that are larger, occur at worse times for adequate dispersal, and have greater impacts on areas of human habitation than prescribed fires (Huff et al. 1995). Nevertheless, potential impacts to air quality from prescribed fires would be reduced due to reduced fuel consumption within a given area and 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). In addition, total emissions from proposed activities would be spread out over a three to five year implementation period.

Socio-political considerations and/or unfavorable changes in transport winds may necessitate a curtailment in prescribed burning at the local level. This would be determined on a case-by-case basis with a change in forecasted burn conditions communicated to the WA DNR.

The Forest Plan has no special requirements for smoke management beyond those required by the Clean Air Act. 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.

Cumulative Effects

Past and current activities within the analysis area were incorporated into the direct and indirect effects analysis. Reasonably foreseeable actions are not expected to alter the effects analysis when added to those effects resulting from implementation of Alternative B.

Along with existing airshed pollutants, smoke from prescribed fire activities may cumulatively degrade air quality within the Renshaw analysis area and surrounding Pend Oreille River valley, but only for short duration. Coordinated meteorological scheduling would be used to regulate all prescribed burns within the regional area, thus minimizing the potential for cumulative smoke impacts to the public. Prescribed burns would be scheduled and approved by the WA DNR only during periods of favorable atmospheric transport and dispersion. To ensure compliance with state

and federal air quality standards, approved burning would be determined through monitoring and computer modeling of all scheduled and proposed emissions. This includes proposed burns from state, private and federal ownerships. For an “average” spring or fall burn prescription, NAAQS for PM10 permits ignition of up to 500 acres of Fuel Model 11/12 (activity fuels) or 750 acres of Fuel Model 2/5/8/9/10 (natural fuels). Historically, less than 100 acres are ignited on the district on a daily basis due to cumulative smoke considerations and/or limited resource capabilities.

Based on implementation of design criteria listed in chapter 2 Alternative B would meet Forest Plan direction for air quality.

Social & Economic Factors

Special Uses/Air Force

Information provided in this Environmental Assessment about special uses is excerpted from the Renshaw Special Uses Report by Special Uses Administrator Karen Nooney (July 2014), and US Air Force Liaison Rick Hall (July 2014). Both reports are available in the project analysis files.

Affected Environment

There are four special use authorizations located within the Renshaw analysis area. Three authorizations are for communication facilities and road access.

Air Force

The USAF operates on the Colville National Forest under the terms and conditions of a Special Use Permit issued to the 336th Training Group, Air Education Training Command (Survival School) located at Fairchild Air Force Base.

The Muddy Training Area inside the Renshaw analysis area is the only training area affected and is used primarily during the summer season. The current 3-year plan has the Muddy area scheduled for 2014-2016.

Direct, Indirect and Cumulative Effects of Alternative A (No Action)

There would be no effect to the facility and road access authorizations. However, the fuels build up in the Renshaw analysis area creates the possibility of losing vital resources in the Survival School, Muddy training area. Vegetation would continue to grow and create thicker stands, where students can’t travel very well on foot. Small game may decline due to a lack of forage production. There is no short-term effect if no commercial timber harvesting takes place, if no truck traffic takes place, or if no precommercial thinning takes place on the Survival Schools use of the Muddy area.

Direct, Indirect and Cumulative Effects of Alternative B

If the recommended design criteria for special uses are followed, none of the alternatives would affect existing special use permits.

The effect of smoke, fire traffic, ignition and fire spread, residual effect and benefits of fire are through the use of prescribed burning. In general the short term (1-5 years) would be a negative effect. The benefits would come with the long term (5-10 years). Alternative B has more potential to affect Survival School activities in the Muddy training area because there are more activities, acres of fuels treatments, and trucks hauling.

In general, more acres of harvest, precommercial thinning, and increased log truck traffic would be an adverse effect in the short term. The long term would potentially be a positive effect.

Forest Plan Consistency

The Renshaw Vegetation Management Project, with the design criteria provided, meets the Forest Plan Standards and Guidelines for Special Uses/Air Force.

Minerals

Information provided in this Environmental Assessment about special uses is excerpted from the Renshaw Special Uses Report by Special Uses Administrator Karen Nooney (July 2014). The full report is available in the project analysis files.

A review of the Bureau of Land Management (BLM) database identified no active mining claims within the analysis area. None of the alternatives are expected to impact mineral resources.

Cumulative Effects

Effects of past and present actions are included as part of direct and indirect effects. Reasonably foreseeable actions would not cumulatively affect special use authorizations.

A determination has been made that the actions described under Alternative B would be consistent with direction provided by the Colville National Forest Plan with regards to special uses and minerals.

Logging System and Economic Feasibility Analysis *(Purpose & Need Objective 4)*

Information provided in this Environmental Assessment about economics and logging systems is excerpted from the Renshaw Economic Analysis Report by Timber Management Assistant Eric Trimble (July 2014). The full report is available in the project analysis files.

Existing Condition, Direct, Indirect Effects, and Cumulative Effects

The economic analysis is based on activities proposed under Alternative B and any connected actions.

Logging Systems and Harvest Costs

At least 20 percent of the proposed harvest area within the Renshaw analysis area would most likely be dropped from commercial harvest due to one or more of the following factors:

1. Resource protection (e.g. streams and wetlands, sensitive wildlife areas);
2. Operational feasibility (e.g., blind leads and steep slopes within designated ground-based units); or
3. Dispersed recreation and heritage sites.

The 20 percent area harvest reduction is reflected within the analysis calculations. Overhead costs are not included.

Gross revenue is the price offered for delivered logs from area mills. Local stand exam data, processed and modeled using the Forest Visualization System (FVS), was used to predict harvest

volumes. Stumpage value is the logging/hauling costs subtracted from the delivered log price. Project value is the proposed project costs subtracted from the stumpage value.

Timber harvest activities can reasonably be expected to result in economic benefits for rural communities. Estimates of direct and indirect jobs per year created from one million board foot (MMBF) of timber harvested in Washington State range from 7.7 to13.2 direct jobs per MMBF per year and 32.3 to 36.82 indirect jobs per MMBF per year (Mason, Larry C. 2005). Based on a volume estimate of 27.092 MMBF the number of jobs that this project is expected to support include 208 direct, 790 indirect and 998 total jobs (Lippke, B. and Mason, L. 2005).

Under the No Action alternative, no harvest, precommercial thinning, tree planting, road decommissioning or fuel reduction activities would occur. Except for the in-house planning costs Alternative A would incur no costs or revenues.

Alternative B includes up to 4,970 acres of commercial treatments. Logging systems proposed include ground-based (tractor, cut-to-length processors, feller-bunchers, rubber-tired skidders and forwarders) and skyline cable (line machines). Designated commercial material, sawtimber and non-sawtimber wood products, within approximately 95 percent of the proposed harvest units would be yarded with a ground-based system and less than 5 percent yarded with a skyline cable system. Variations of these systems include ‘swing yarding’ – a combination of ground-based and skyline cable systems – to facilitate yarding from relatively difficult settings.

Transportation System

1. Alternative B Option 1: Relocation of the Rocky Creek Road which includes approximately 3 miles of system road construction; 32 miles of system road reconstruction; 9 miles of temporary road construction and decommissioning; rock pit development; at least 8 culvert installations and upgrades; and 7 miles of system road decommissioning. Appraised costs: $1,158,560 or $42.76/MBF.

2. Alternative B Option 2: Use of the existing Rocky Creek Road which includes replacing 3 bridges on the Rocky Creek Road; 32 miles of system road reconstruction; 9 miles of temporary road construction and decommissioning; rock pit development; at least 7 culvert installations and upgrades; and 5 miles of system road decommissioning. Appraised costs: $1,078,560 or $39.81/MBF.

Table 16. Alternative B Project Value- Option 1

Logging System	Stumpage Value ($/Acre)	Project Costs ($/Acre)	Net Value ($/Acre)	Volume/ Acre (MBF)	Net Value ($/MBF)	Acres	Project Value
Ground-based	$809	-$610	$199	6.8	$29	3,776	$751,424
Skyline Cable	$320	-$610	*-$290*	6.8	*-$43*	200	*-$58,000*
Total						3,976	**$693,424**

Table 17. Alternative B Project Value – Option 2

Logging System	Stumpage Value ($/Acre)	Project Costs ($/Acre)	Net Value ($/Acre)	Volume/ Acre (MBF)	Net Value ($/MBF)	Acres	Project Value
Ground-based	$830	-$610	$220	6.8	$32	3,776	$830,720
Skyline Cable	$340	-$610	*-$270*	6.8	*-$40*	200	*-$54,000*
Total						3,976	**$776,720**

Feasibility

Feasibility is based on the Colville Forest Plan objectives, financial efficiency, salability to potential purchasers and opportunities to reduce costs and increase revenues.

1. Colville Forest Plan Objectives:

   The proposed Renshaw project meets or exceeds forest plan standards for long-term sustained yield timber harvest and resource protection.

2. Financial Efficiency:

   Ground-based units: Given relatively low operating costs proposed ground-based harvest units are cost-efficient and should contribute to a net positive public benefit and financial return for both transportation options.

   Skyline cable: Given relatively high operating costs the cost-efficiency of skyline cable harvest is marginal at best. Few areas would require skyline cable.

3. Salability to Potential Purchasers:

   At least two timber sales and/or stewardship projects would be planned for Alternative B. Given current and projected market conditions, Alternative B should be economically feasible to local purchasers.

Alternative B is economically feasible and meets regional and local standards for salability and financial efficiency.

Safety

The mechanization of ground-based harvesting has dramatically reduced the fatality and injury rates within the industry. Mechanized equipment such as feller-bunchers and cut-to-length processors are designed to protect the operator from being struck by falling logs and debris from tree felling and processing.

Implementation of any projects would follow all Office of Safety and Health Administration (OSHA) and Federal Aviation Administration (FAA) standards and requirements.

Special Concerns

Effects on American Indians

The Kalispel Tribe of Indians, Confederated Tribes of the Colville Reservation, and the Spokane Tribe of Indians were consulted, and no impacts to American Indian social, economic or

substance rights are anticipated. No impacts are anticipated related to the American Indian Religious Freedom Act. Kalispel, Spokane, and Colville Tribal members use the National Forest for recreation, religious purposes, and to gather forest products such as firewood and huckleberries. Tribal members' use of this area of the National Forest would not be disproportionately affected when compared to other people for any of the alternatives considered with this project.

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

The United States Environmental Protection Agency - Office of Environmental Justice defines environmental justice as follows:

"Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work."

Executive Order 12898 signed February 11, 1994 by President Clinton requires an assessment of whether minority or low-income populations would be disproportionately affected by proposed actions. An environmental justice concern arises when action may involve a potentially disproportionate, high, and/or adverse environmental or human health effect on identifiable low-income or minority communities.

Scoping was conducted to elicit comments on the proposed action from all potentially interested and affected individuals and groups without regard to income or minority status. We did not receive any specific comments concerning any potential disproportionate affects to low-income and minority populations.

The alternatives were assessed to determine whether they would disproportionately impact minority or low-income populations in accordance with Executive Order 12898. Approximately 22 percent of the people in Pend Oreille County have an income that is below the federal poverty level (U.S. Census 2012). Low-income people use the National Forest for recreation and to gather forest products such as firewood, game species, and berries. The Proposed Action should not significantly restrict or inhibit the gathering of firewood, berries or hunting of game animals. Several of the treatments prescribed would enhance firewood opportunities such as leaving access roads open for a period of time after project completion. Forest Road 7018285 (0.2 mile) would be brushed out to access timber stands for management. The road would be kept open to the public for 1-2 seasons post-harvest, to provide firewood cutting opportunities.

The project would likely produce a short-term economic benefit to the local community. The benefits would come in the form of increased employment in local timber companies. The project would also benefit companies and businesses that support those operations including local fuel businesses, mechanics, and other businesses that provide support services

The alternatives were assessed to determine whether they would disproportionately impact minority or low-income populations in accordance with Executive Order 12898. Approximately 22 percent of the people in Pend Oreille County have an income that is below the federal poverty level (U.S. Census 2012). Low-income people use the National Forest for recreation and to gather

forest products such as firewood and huckleberries. We have no evidence that low-income people use this area of the National Forest disproportionately when compared to other people.

Based on the composition of the affected communities, along with cultural and economic factors, the activities that are proposed would have no disproportionately adverse effects to human health and safety, or environmental effects to minorities, those of low income, or any other segments of the population. There are no significant negative direct, indirect, or cumulative effects relative to issues of environmental justice through the implementation of the action alternative.

Land Use (prime farm or rangeland)

There would be no effect of any alternative to prime farmland or rangeland associated with the implementation of any proposed alternative, provided design criteria and BMPs listed in chapter 2 are fully implemented.

Project-Scale Effects Conclusions on Climate Change

Alternative A does not propose any commercial vegetation treatment. Alternative B would affect approximately 4,970 acres of forest by commercially thinning smaller trees from the stand, retaining a residual stand of about 50 to 75 percent of the original stand by basal area.

This scope and degree of change would be minor relative to the amount of forested land (31,335 acres) within the Lost Creek and Maitlen Creek sub-watersheds as a whole. A project of this magnitude would have such minimal contributions of greenhouse gasses that its impact on global climate change would be infinitesimal. Therefore, at the global scale, the proposed actions direct and indirect contribution to greenhouse gasses and climate change would be negligible.

In addition, because the direct and indirect effects would be negligible, the proposed actions contribution to cumulative effects on greenhouse gasses and climate change would also be negligible. It is suggested that land managers not recreate a fixed pre-settlement condition but strive for forest conditions that are more resilient and resistant to disturbance impacts (North et al., in press and Millar et al., 2007)

The Intergovernmental Panel on Climate Change has summarized the contributions to climate change of global human activity sectors in its Fifth Assessment Report (IPCC 2014). The top three anthropogenic (human-caused) contributors to greenhouse gas emissions (from 1970-2004) are: fossil fuel combustion (56.6 percent of global total), deforestation (17.3 percent), and agriculture/waste/energy (14.3 percent). IPCC subdivides the deforestation category into land use conversions, and large-scale deforestation. Deforestation is defined as removal of all trees, most notably the conversion of forest and grassland into agricultural land or developed landscapes (IPCC 2000).

This project does not fall within any of these main contributors of greenhouse gas emissions. Forested land would not be converted into a developed or agricultural condition. In fact, forest stands are being retained and thinned to maintain a vigorous forested condition that can continue to support trees and sequester carbon long-term.

Evidence since the Fourth Assessment Report reveals that there is a high confidence in increased ecosystem vulnerability due to multiple and interacting climate stresses in forest ecosystems, including wildfire activity, regional drought, high temperatures, and infestations. Adaptation practices can buffer against climate stresses to some degree in these ecosystems, both through increasing system resilience, such as forest management to reduce vulnerability to infestation.

This project is also consistent with IPCC recommendations for land use to help mitigate climate change. The 2007 IPCC report summarizes sector-specific key mitigation "technologies." For the forestry sector, the report recommends forest management including management to "improve tree species" and increase biomass. The proposed action is consistent with these recommendations because it would: restore species composition, spatial pattern and forest structure; increase resilience to disturbance (fire and insects); relieve competitive pressures in the residual stands; and prepare seed beds for natural and planted regeneration.

Timber management projects can influence carbon dioxide sequestration in three main ways: (1) by increasing new forests (afforestation), (2) by avoiding their damage or destruction (avoided deforestation), and (3) by manipulating existing forest cover (managed forests). Land-use changes, specifically deforestation and regrowth, are by far the biggest factors on a global scale in forests' role as sources or sinks of carbon dioxide, respectively (IPCC, Intergovernmental Panel on Climate Change, 2000). Projects that create forests or improve forest conditions and capacity to grow trees are positive factors in carbon sequestration. The proposed action falls into this category.

It is important that these carbon resources are protected in the short term and that these forested ecosystems are managed to increase carbon sequestration in mid to long-term timeframes. Re-introducing fire back into fire adapted ecosystems as well as related restoration thinning can have significant, positive impacts on protecting carbon stocks as well as sequestering additional carbon, and potentially buffering historically high carbon concentrations in the atmosphere.

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CHAPTER 4 – Consultation With Others

The opportunity for public participation in the analysis of this project was initiated through a scoping letter sent to the public, including adjacent landowners, Federal, State, and local agencies, Tribes, and other non-Forest Service persons and interested parties on July 16, 2013; at four public collaboration meetings (at the Newport Ranger District office on January 30, 2013, at the Kalispel Tribe's Camas Wellness Center on March 7, 2013, at the Newport Ranger District office on March 28, 2014, and at the Lands Council office in Spokane on June 10, 2014); at a public open house held at the Ione Community Center in Ione, WA on September 4, 2014; a formal 30-day comment period (September 3, 2014 to October 3, 2014); and listing in the Colville National Forest's Projects Publication (first published March 2013 through the present).

The Forest Service consulted with Federal, State, and local agencies, Tribes and non-Forest Service persons, including adjacent landowners, during the development of this environmental assessment. Input was received from the following groups and individuals:

The Kalispel Tribe
Karen Skoog, Steve Kiss, and Mike Manus, Pend Oreille County Commissioners
Carl Wright and Liz Johnson-Gebhardt, Priest Community Forest Connection
Ken Timmreck, Selkirk Trailblazers Club
Steve Fogle, Colville Drift Riders Snowmobile Club
David Heflick, Jeff Juel, Maurice Williamson, Dick Dunton, Josh Anderson, and Mike Petersen representing the Northeast Washington Forestry Coalition
Vern Moore
Sam Castro, Pend Oreille County Public Works Department
John Holmberg
Todd Foster, USAF
Andrew S. Reisenweber, USAF
Ole Sleipness
Richard Artley
Gary Nielsen
Vaagen Bros. Lumber, Inc.
Stevens County Commissioners

Letters, meeting notes and documentation of phone conversations from the above individuals are in the public involvement section of the analysis file for this project. Letters and emails containing specific comments, along with the Forest Service responses, are in Appendix A of the Decision Notice and Finding of No Significant Impact.

Forest Service Contributing Personnel:

Supervisor's Office Staff

Kathy Ahlenslager	Forest Botanist
Alicia Beat	Forest Archaeologist
Lucy Reeves	Civil Engineer
Karen Nooney	Forest Special Uses Administrator
Vaughn Hintze	Forest Landscape Architect (retired)
Scott Brogan	Silviculturist

Newport-Sullivan Lake Ranger District Personnel:

Michelle Paduani	District Environmental Coordinator/ID Team Leader
Mike Borysewicz	Wildlife Biologist
Brian Hicks	Assistant Fire Management Officer
Bill Zoodsma	Assistant Fire Management Officer
Eric Trimble	Economics/Logging Systems
Rob Lawler	Hydrologist
Chase Bolyard	Rangeland Management Specialist, Noxious Weed Coordinator
Kevin Walton	Recreation Forester
Nan Berger	Recreation Specialist
Orin DeGroat	Timber Sale Administrator
Terri Contreras	GIS Coordinator
Rick Hall	US Air Force Liaison
Lindsay Lockard	Presale Forestry Technician
Marcy Rumelhart	Writer/Editor
Gayne Sears	District Ranger

Three Rivers Ranger District Personnel:

Jason Jimenez	Soil Scientist
Karen Honeycutt	Fisheries Biologist
Meghan Lyons	Biological Technician
Bill Swartz	Hydrologic Technician

Finding of No Significant Impact

As the responsible official, I am responsible for evaluating the effects of the project relative to the definition of significance established by the CEQ Regulations (40 CFR 1508.13). I have reviewed and considered the EA and documentation included in the project record, and I have determined that Alternative B Option 1 will not have a significant effect on the quality of the human environment. As a result, no environmental impact statement will be prepared. My rationale for this finding is as follows, organized by sub-section of the CEQ definition of significance cited above.

Context

For Alternatives A and B the context of the environmental effects is based on the environmental analysis in this EA. All impacts of this project will occur locally and will not have a cumulative effect on the Region or Nation as a whole.

Intensity

Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effects analysis of this EA and the references in the project record. The effects of this project have been appropriately and thoroughly considered with an analysis that is responsive to concerns and issues raised by the public. The agency has taken a hard look at the environmental effects using relevant scientific information and knowledge of site-specific conditions gained from field visits. My finding of no significant impact is based on the context of the project and intensity of effects using the ten factors identified in 40 CFR 1508.27(b).

1. **Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. [40 CFR §1508.27(b)(1)**]

   Beneficial and adverse impacts were identified. They are considered in both context and intensity. In balance, the beneficial outweigh the adverse impacts. A thorough effects analysis (direct, indirect, and cumulative) is available in chapter 3 of the EA (pages 37-120), and in the Biological Evaluations (in the project record.)

   The following are the beneficial impacts of the decision related to the purpose and need of the Renshaw project:

   - **Silviculture:** Vegetation treatments are expected to reduce overstocking, remove diseased trees, and modify tree species composition for the purpose of improving forest health.

   - **Fire and Fuels:** Vegetation treatments will reduce the risk, from a wildfire event, to private land, infrastructure, and forest values, and increase the effectiveness and efficiency of protecting property within the wildland-urban interface.

     - Of the 6,090 acres identified for treatment to meet the purpose and need, all of those acres will receive treatment under the decision, lessening the risk of adverse impacts in the event of a wildfire.

     - Fire will be reintroduced on the landscape, which will result in a lesser chance of high severity fire impacting the analysis area.

- **Fisheries:** Stand-replacing fire risk will be reduced both within and adjacent to the Riparian Habitat Conservation Areas (RHCAs). Fuel treatments (underburns) within the RHCA are beneficial to the RHCA because they prevent the complete loss of trees and vegetation from a possible wildfire and would burn small woody debris and leave large down woody material intact. With regard to water quality, the burning of slash and burning to restore open ponderosa pine and Douglas-fir forest stands will result in nutrient flushes into streams supporting fisheries.

- **Hydrology and Fisheries:** The obliteration of County Road 4699 (Rocky Creek Road) (Option 1) post project will include re-establishing flood plain, removing three outdated bridge structures and two tributary culvert removals on Lost Creek, and recontouring and/or decompaction of the road prism. Reconstruction and relocation of the new road should result in a moderate beneficial effect over the longer term, as sediment production from road templates decreases due to new armoring, drainage structure placement, and revegetation. There will be an immediate, small short-term increase in sediment, but an overall reduction in sediment risk and a net decrease in sediment yield long-term.

- **Wildlife (Big Game):** Treatments of all units will result in more browse and forage and a better distribution of cover and forage than currently exists. Additionally, mechanical crushing and/or burning of dead and tall shrubs will either stimulate sprouting or compact browse allowing big game to reach it. Closure of approximately 2.8 miles of National Forest system roads will reduce total road density in the project area.

- **Provide sources of employment and forest products:** The decision will provide opportunities for employment through contracting the implementation activities and is expected to result in two to four wood products contracts and possible stewardship contracts with advertisement of the first contract expected to occur in 2015.

The following resources identified these additional beneficial impacts for the Renshaw project:

- **Roads:** Approximately 7 miles of FS system road will be decommissioned. This helps the FS to efficiently spend their limited road maintenance dollars by reducing or eliminating expenditures on roads not necessary as part of the transportation system.

- **Soil:** Road decommissioning will allow these soils to start to recover slowly; natural processes will be allowed to resume.

- **Hydrology:** The proposed road improvements will reduce the potential for stream crossing failure and road related sediment production and delivery even if a severe wildfire did occur. Road condition improvements will be in the form of improved road drainage by replacing or removing culverts, blading road surfaces, and creating water bars and cross drains. Channel morphology will be maintained and somewhat improved since many of the known sediment delivery sources will be rehabilitated. These activities will help to bring some of the stream reaches into a positive trend towards a properly functioning condition.

- **Range:** Increased forage and foraging areas for livestock will result from the vegetation and fuels treatments.
- **Visual Quality:** While there will be short-term noticeable changes due to various burn methods, a resilient, healthy, more open, natural appearing landscape and potentially sustaining, scenic forest setting is expected to further long-term enhancement objectives.

2. The degree to which the proposed action affects public health or safety. [40 CFR §1508.27(b)(2)]

There are a number of health and safety hazards to Forest Service employees and the general public with carrying out the proposed action. None are unusual or unique to the Renshaw project. These are discussed in chapter 3 of the EA; Silviculture pages 37-49; Fire/Fuels pages 49-56; Transportation page 98-102; Recreation page 102-106; and Economic Feasibility Analysis pages 114-116, and include discussions of effects related to smoke, dust, increased traffic, logging hazards, prescribed burning hazards, noise and improved road safety and reduced wildfire risk. Fuel treatment activity should effectively reduce surface fuel loads and crown fire hazards and thus decrease fire suppression costs and the associated risks to both firefighters and the public (EA page 116). Based on the discussions in the EA and review of many similar projects, these public health and safety effects are determined not to be significant.

3. Unique characteristics of the geographic area such as the proximity to historical or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. [40 CFR §1508.27(b)(3)]

There will be no effect of any alternative to prime farmland, rangeland, proximity to historical or cultural resources, parklands, wetlands, wild and scenic rivers, or ecologically critical areas associated with the implementation of any proposed alternative, provided design criteria and BMPs listed in chapter 2 are fully implemented. (EA pg. 94 [soil], design criteria pgs. 14-31)

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial. [40 CFR §1508.27(b)(4)]

There is no known scientific controversy over the impacts of the project. Management actions such as those discussed in Alternative B are done in other areas throughout this Forest and on many other National Forests. Consumers, civil rights, minority groups, public health and safety, and women will not be significantly affected (EA pages 117-118 [environmental justice]; pages 111-113 [air quality]).

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks. [40 CFR §1508.27(b)(5)]

We have considerable experience with the types of activities to be implemented. The effects analysis shows the effects are not uncertain, and do not involve unique or unknown risk. While any action carries some degree of risk, Alternative B was designed, and the analysis summarized in the EA was carefully completed, to minimize unique or unknown risks. In addition, the design criteria and Best Management Practices (EA pages 14-31) will ensure that the effects will be similar to those predicted in the EA. There were no highly uncertain, unique, or unknown risks identified in any of the effects analyses conducted for the Renshaw project. (EA, chapter 3)

6. **The degree to which the action may establish precedent for future actions with significant effects or represents a decision in principle about a future consideration. [40 CFR §1508.27(b)(6)]**

   None of the actions proposed in the Renshaw project set precedents. (EA pages 98, 106, 109, 111, and 114). The Newport and Sullivan Lake Ranger Districts have been conducting timber sales and prescribed burns for years; many of which are similar in scope and nature to those proposed in the Renshaw project. A recent example of timber harvest thinning and prescribed underburning similar to the Renshaw project includes the Hanlon Vegetation Management Project (USDA Forest Service 2010).

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts. [40 CFR §1508.27(b)(7)]**

   Chapter 3 pages 37-120, environmental effects under each resource section, and Appendix B of the EA.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources. [40 CFR §1508.27(b)(8)]**

   The action will not cause loss or destruction of significant scientific, cultural, or historical resources because heritage sites will be protected during future site-specific implementation (EA pages 20-21). Tribal consultation has occurred and supports protective measures proposed. Determination for the project is a “no effect” undertaking, as per Programmatic Agreement Among the USDA Forest Service (PNW R6), The Advisory Council of Historic Preservation, and the Washington State Historic Preservation Office Regarding Cultural Resource Management on National Forests in the State of Washington (1997) (EA pages 7, 109-111; and pgs. 20-21 [design criteria #46-48]; Project Record).

9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973. [40 CFR §1508.27(b)(9)]**

   The effects on endangered or threatened species and their habitats are discussed in the Biological Evaluations in the project record and appendix B of the EA, with results summarized in the EA on pages 77-83 for terrestrial wildlife, fish, and for sensitive plants (project design criteria EA pgs. 14-31; and Appendix B.) On January 12, 2015 the US Fish and Wildlife Service concurred that this project as described in the BEs is not likely to adversely affect the Canada lynx and grizzly bear, and will have no effect to bull trout. The concurrence letter is in Appendix B of the EA and in the project record.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment. [40 CFR §1508.27(b)(10)]**

    The Renshaw project has been examined in relation to a number of environmental laws and requirements, and has been found to be in compliance in all cases. See the discussion of consistency with laws, regulations, and policies starting on page 1of this document.

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List of Acronyms

AIRFA	American Indian Religious Freedom Act
ATV	All-Terrain Vehicle. Used in conjunction with the Colville National Forest Motor Vehicle Use Map
BE	Biological Evaluation (plants, fish, wildlife)
BMP	Best Management Practice (water)
BPA	Bonneville Power Administration
BPE	Biophysical Environment (vegetation)
CCF	Hundred cubic feet (timber volume)
CFR	Code of Federal Regulations
CR	County Road
CTL	Cut-to-length (a mechanized logging system)
CWPP	(Pend Oreille County) Community Wildfire Protection Plan
DBH	Diameter breast height (a method of describing a tree's size)
DecAid	An internet-based advisory tool developed to help land managers evaluate the effects of forest management on wildlife species that use dead wood habitats
EA	Environmental Assessment
FEIS	Final Environmental Impact Statement
FM	Fuel Model
FPARS	Forest Practice Application Review System (WA state land database)
FR	Forest Road
FRCC	Fire Regime Condition Class
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System (computerized mapping and analysis software)
HRV	Historic Range of Variability
ID or IDT	Interdisciplinary Team
INFISH	Inland Native Fish Strategy (fish)
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment and Strategy
LRMP	Land and Resources Management Plan also known as the Forest Plan
MA	Forest Plan management area
MIS	Management Indicator Species (wildlife)
MVUM	Motor Vehicle Use Map (recreation)
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NFS	National Forest System
NRHP	National Register of Historic Places (heritage)
OHV	Off-highway Vehicle
PAG	Plant Association Group (vegetation)
RHCA	Riparian Habitat Conservation Area (fish)
RMO	Riparian Management Objective (fish)
ROS	Recreation Opportunity Spectrum (recreation)
SHPO	State Historic Preservation Office (cultural resources)
SMZ	Streamside Management Zone
SUP	Special Use Permit
TES	Threatened, Endangered and Sensitive (wildlife, plants)
TMDL	Total Maximum Daily Load (hydrology)
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	U.S. Fish and Wildlife Service (wildlife)
VQO	Visual Quality Objective (scenery management)

WADNR	WA State Department of Natural Resources
WEPP	Water Erosion Prediction Project (a physically-based soil erosion model that describes the processes that cause erosion)
WUI	Wildland Urban Interface

Glossary

Term[13]	Definition
Basal Area	The cross-sectional area of all stems of a species or all stems in a stand measured at breast height and expressed per unit of land area. Tree basal is used to determine percent stocking.
Best Management Practice(s) (BMPs)	A practice or usually a combination of practices that are determined by a state or designated planning agency to be the most effective and practicable means (including technological, economic, and institutional considerations) of controlling point and nonpoint source pollution at levels compatible with environmental goals.
Biomass (woody)	The mass of the woody parts (wood, bark, branches, twigs, stumps, and roots) of trees (alive and dead) and shrubs and bushes, measured to a specified minimum diameter at breast height (dbh). Includes above-stump woody biomass, stumps, and roots. Excludes foliage.
Closed or Restricted roads	Refers to National Forest System roads with restricted access. Roads proposed for closure would change to maintenance level 1 which are National Forest system roads that are closed with either a closure device (e.g., earthen berm, gate) or naturally by allowing vegetation to invade the road template.
Commercial thinning (HTH)	The removal of a portion of the trees in even-aged or uneven-aged stands to control stand spacing and favor desired trees. The objectives are to remove trees that exhibit poor form, vigor, or pose a significant risk of insect or disease mortality; reduce competition; and to increase growing space for the development of large trees. A fully stocked stand with 40+ residual trees larger than 6” in diameter would result from this treatment.

[13] Additional information can be found in specialist reports in the project file.

Term[13]	Definition
Commercial thinning/Shelterwood (HTH/HSH)	The stands would be a mix of commercial thinning and shelterwood. Portions of the stand that are stagnant and would not readily move towards a late structural stage without regenerating the area would receive a shelterwood harvest. The remainder of the stand would be thinned. Within the Renshaw project area, those areas proposed for shelterwood harvest are primarily lodgepole pine pockets that would not respond to a release (thinning) treatment.
Decommission	Decommissioning (FSM 7734.1) refers to removing National Forest System roads from the forest road database. Decommissioning of a road could include one or more of the following treatments: ▪ Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; ▪ Blocking the entrance to a road or installing water bars; ▪ Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; ▪ Completely eliminating the roadbed by restoring natural contours and slopes; and ▪ Other methods designed to meet the specific conditions associated with the unneeded road.
Diameter at Breast Height (DBH)	Diameter at breast height; usually measured at 4 ½ feet above the ground.
Ecological Processes	Natural activities fundamental to the functioning of a healthy and sustainable ecosystem, usually involving the transfer of energy and substances from one medium or trophic level to another.
Ecosystem	A dynamic complex of living organisms (plant, animal, fungal, and micro-organism communities) and the associated nonliving environment with which they interact.

Term[13]	Definition
Endangered Species	A non-critically endangered taxon that is facing a high risk of extinction in the wild in the near future, as defined by any of the criteria A to E of IUCN (1998). (*IUCN, World Conservation Monitoring Center. 1998. In: Walter, K.S.; Gillett, H.J., eds. 1997 IUCN red list of threatened plants. Gland, Switzerland and Cambridge, United Kingdom. lxiv + 862 p.)*
Erosion	The movement of soil materials from one place to another. The movement of soil due to natural processes should be distinguished from that related to forest harvesting, road construction, or other human alterations.
Fire Regime Condition Class (FRCC)	Used to describe the degree of departure from the historic fire regimes that result from alterations of key ecosystem components such as composition, structural stage, stand age, and canopy closure.
Forest Available for Timber Production	Forest land that is producing or is capable of producing industrial wood and is not withdrawn from timber utilization by statute, administrative regulation, or formal conservation reserve purposes. Includes forest with conditions suitable for timber production even if so situated as to not be immediately accessible for logging.
Forest Ecosystem	A dynamic complex of plant, animal, and micro-organism communities, and their abiotic environment interacting as a functional unit, where the presence of trees is essential. Humans, with their cultural, economic, and environmental needs are an integral part of many forest ecosystems.
Fragmentation	Describes one aspect of habitat capacity. Refers generally to the reduction in size of forest patches with coincident decreases in forest connectivity and increases in patch isolation and amount of forest edge. The fragmentation of a forest into small pieces may disrupt ecological processes and reduce the availability of habitat.

Term[13]	Definition
Fuel Model (FM)	Fuel Models are based on ground cover conditions (i.e., grass, shrubs, slash or other timber litter), and the amount of ladder fuels creating connectivity to the canopy, that describe fire hazard potential.
Habitat	The natural environment of a living organism, primarily determined by vegetation, climate, soils, geology, and topography.
Hydrologic Unit Code (HUC)	A hierarchical watershed delineation system developed by the U.S. Geological Survey where the number of digits represents the size and/or category (e.g. Lost Creek 170102160206 – HUC 12 – subwatershed). A more complete description of HUCs may be found at: http://water.usgs.gov/GIS/huc.html
INFRA	An internal Forest Service Database, not an acronym, used to track Forest improvements such as roads and trails.
Long Term	Occurring over or involving a relatively long period of time. In natural resources, generally periods of 50 years or more.
Management Indicator Species (MIS)	The Management Indicator Species approach singles out a few representative species for active management and conservation. Essential habitats provided for each indicator species would in turn support many other animals with similar habitat requirements.
Mastication	The process of grinding, shredding, or chopping surface and ladder fuel residue. It can be used in lieu of prescribed fire–either due to risk of escape, smoke concerns, or other management constraints.

Term[13]	Definition
Mechanical Fuels (MF) treatment	Mechanical fuel treatments are being done in commercial treatment stands to reduce fuels to historic conditions and create planting spots for regeneration. Treatments may include machine piling, noncommercial tree felling and hand piling. Mechanical fuel treatments may also prepare the stands for future underburning. Mechanical fuel treatment may be done in areas where prescribed fire would likely result in losses to the residual overstory, such as trees species that are not fire tolerant or small diameter trees that have not yet developed enough bark to insulate them from the fire.
Merchantable	Trees of a size, quality, and condition suitable for marketing under given economic conditions, even if so situated as to not be immediately accessible for utilization.
Mixed Use or Motorized Mixed Use	Designation of a National Forest System road for use by both highway-legal and non-highway-legal motor vehicles.
Monitoring	The periodic and systematic measurement and assessment of change of an indicator.
Mortality, annual	The average annual volume of sound wood in trees that dies from natural causes during a specified year or on average during the period between inventories.
Native Species	Usually, a species known to have existed on a site before the influence of humans. It depends on the temporal and spatial context of analysis, since long-established exotic species are often considered to be native by default.
Nonmerchantable	A species that has no known commercial uses for wood products. Merchantability is usually judged according to the suitability of a species for pulp, paper, lumber, or specialty wood products. Both native and exotic tree species can be considered merchantable tree species.

Term[13]	Definition
Obliterate	Road prisms would be decompacted to mineral soils (minimum 18”) and slope would be contoured and out sloped to facilitate drainage, all stream-crossing structures removed, and be rendered hydrologically stable. Slash would be incorporated onto decompacted area for erosion control.
Overstory Removal (HOR), Final Removal (HFR)	The overstory removal would be used to release an already established cohort of seedling and sapling sized trees. It would be implemented similar to a shelterwood where a portion of the overstory would be removed. The trees to be removed would be trees that are not expected to become large diameter trees such as lodgepole pine, trees that have been infected by a pathogen such as western larch infected with dwarf mistletoe, or trees that have been attacked by insects.
Pit Run	Pit run material refers to rocky material extracted directly from the source and placed without, or with minimal, processing.
Plantation	Forest stands consisting almost exclusively of planted trees of native or exotic species, and managed to generally maintain this composition at maturity. Management practices may include extensive site preparation before planting and suppression of competing vegetation. Forests that fall outside this classification are not necessarily natural forests.
Planting	Artificial reforestation to regenerate a stand or interplant to supplement natural regeneration. Planting would reintroduce species that may be absent or lacking in the stand as a result of past disturbances. Planting 1 to 3 year old seedlings on the site will help overcome the competition of brush or grasses. Planting helps to rapidly re-establish the next stand and move it towards the desired future condition. Relying on only natural regeneration can often be difficult and unsuccessful in re-establishing the desired mix of species on the site.

Term[13]	Definition
Precommercial Thinning	Treatment in plantations that do not have enough commercial value to treat with a harvest prescription, but would benefit by thinning out small-diameter trees, allowing residual trees to grow and increasing overall stand vigor. Cut trees would be bucked, lopped, and scattered on the site. Generally, the stands would be thinned on a 12 feet by 12 feet spacing where topography and economics would allow for a future commercial thinning in 20 to 40 years. In stands that a future commercial thin is not considered to be economically feasible then the average PCT spacing should be increased to approximately 14ft by 14ft. A mix of different species including hardwoods is preferred after treatment with a priority on leaving the healthiest trees with greater than 40 percent live crown ratios and removing trees with damage or disease evident.
Reference Condition	Any datum against which change is measured. It might be a “current baseline,” in which case it represents observable, present-day conditions. It might also be a “future baseline,” which is a projected future set of conditions excluding the driving factor of interest. Alternative interpretations of the reference conditions can give rise to multiple baselines.
Resilience	The ability of an ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, and the capacity to adapt to stress and change. (FSM 2020)
Sedimentation	The deposition of eroded soil materials suspended in the water of creeks, lakes, or other water bodies. Sedimentation takes place when water velocity falls below a point at which suspended particles can be carried.
Seed Tree harvest (HCR)	A regeneration harvest method that would retain 12 to 15 seed trees per acre. This treatment would convert areas dominated by mature lodgepole pine which is at a high risk of attack by mountain pine beetle to more of a mixed stand of blister rust-resistant western white pine, western larch and ponderosa pine through planting.

Term[13]	Definition
Shelterwood regeneration harvest (HSH)	All trees would be harvested except those needed for seed, wildlife, and shelter for the stand-to-be. Residual stand retains 12-30+ trees/acre in the overstory. Generally, the largest trees available would be left as green-tree replacements for snags. This prescription is mostly used on dense, stagnant stands to produce a new stand of early seral species (seedlings) capable of growing toward late structural stage.
Shelterwood/Single Tree Selection harvest (HSH/HSL)	The stands would be a mix of shelterwood and single tree selection.
Significant Dispersed Campsite	Significant dispersed campsites are popular, high-use campsites as defined by district recreation specialists. Designation of these sites as significant could change yearly based on use patterns determined by recreation staff.
Single Tree Selection harvest (HSL) Partial Removal (HPR), and Small Group Selection harvest (HSG)	The removal of selected trees from specified size and age classes over the entire stand in order to meet a predetermined goal of size or age distribution and species composition in the remaining stand. The criteria for selecting trees are similar to the thinning prescription, but more emphasis is placed on controlling the stocking levels in various age and size classes within the stand. The result of this treatment is a fully stocked stand that exhibits a variety of stocking densities, usually a variety of species, and may have small openings created from < 1 acre up to 5 acres where a new crop of seedlings would become established. Residual basal area typically ranges from 50-100 sq. ft. The residual stocking level can be adjusted to favor either shade tolerant or shade intolerant species depending on the objectives for the stand.
Single Tree Selection harvest/Shelterwood (HSL/HSH)	The stands would be a mix of single tree selection and shelterwood.
Soil	The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.

Term[13]	Definition
Soil Degradation	Negative process often accelerated by human activities (improper soil use and cultivation practices, building areas) that leads to deterioration of soil properties and functions or destruction of soil as a whole (e.g., compaction, erosion, salinization, and acidification).
Soil Erosion	The movement of soil materials from one place to another. The movement of soil due to natural processes should be distinguished from that related to forest harvesting, road construction, or other human alterations. Note: Significant erosion needs to be defined by each country and with respect to variation between different landscapes and soils.
Soil Organic Matter	The organic fraction of the soil that includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population;commonly determined as the amount of organic material in a soil sample passed through a 2-mm sieve.
Special harvest (HSP)	This treatment would be used adjacent to the Teepee Seed Orchard to remove western white pine and Engelmann spruce within a pollen dilution zone to reduce the cross pollination with the seed orchard trees. Fuels treatment s are also proposed around the seed orchard to reduce the fire danger to the orchard trees and improvements.
Species at Risk	Federally listed endangered, threatened, candidate, and proposed taxon and other taxon for which loss of viability, including reduction in distribution or abundance, where survival is a concern.
Species Diversity	The number and variety of species in a given area.
Stand Density Index (SDI)	Stand density index measures stocking density based on relationship between number of trees, average diameter, basal area, and volume based on pure even-aged stands. It is based on fully stocked even-aged stands of a species having the same quadratic mean diameter having approximately the same maximum number of trees per acre. (From *Forest Management*, Lawrence Davis & K. Norman Johnson, 1987)

Term[13]	Definition
Stream Flow	The quantity of water in a watershed based on precipitation quantity and the ability of the watershed to store and slowly release water. Typically characterized by seasonal periods of high or low water flow. Changes in high or low flow patterns are indicative of changes in precipitation patterns and changes in the integrity of watersheds that affect its ability to absorb and regulate water flow patterns.
Sub-watershed	A 12th HUC basin typically covering 10,000 to 40,000 acres.
Sustainable Forest Management	The stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, and vitality, and forest's potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and not cause damage to other ecosystems. The criteria and indicators are intended to provide a common understanding of what is meant by sustainable forest management. They provide a framework for describing, assessing, and evaluating a country's progress toward sustainability at the national level and include measures of— 1. Conservation of biological diversity. 2. Maintenance of productive capacity. 3. Maintenance of forest ecosystem health. 4. Conservation and maintenance of soil and water resources. 5. Maintenance of forest contribution to global carbon cycles. 6. Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of society. 7. Legal, institutional, and economic frameworks for forest conservation.
Threatened Species	Plant or animal species likely to become endangered throughout all or a significant portion of their range within the foreseeable future.

Term[13]	Definition
Total Maximum Daily Load (TMDL)	Under section 303(d) of the Clean Water Act and EPA regulation (40 CFR 130.2(J), 130.7), states are given authority to list which waters do not meet water quality standards or have impaired beneficial uses. This list of impaired waters is commonly known as the "Section 303(d) list". The individual states are directed by the EPA to improve the aquatic conditions of those streams not supporting beneficial uses. Once a water body is listed as impaired, it is the state's responsibility to develop a Total Maximum Daily Load (TMDL) for each pollutant of concern. These TMDLs are then submitted to EPA for review and approval or disapproval.
Underburn (UB)	A method of reintroducing fire on the landscape. This treatment would help in reducing fuel loadings to historic conditions. Treatments may include felling of trees to increase surface fuels followed by prescribed fire. Underburning would help reduce undesirable competing vegetation, including conifers and brush. Also a benefit of underburning would be to make browse species more palatable to big game by stimulating new sprouts. Underburning also would help to regenerate hardwood species, such as aspen and birch through sprouting. Repeated underburnings would be necessary in some stands on drier sites to maintain open park-like stands, mimicking historical fire return intervals. Underburning would also help in raising the lower crown height by reducing the lower live limbs, resulting in a lowered risk of surface or ground fires climbing into the crown of the trees.
Watershed	A 10th HUC basin typically covering 40,000 to over one hundred thousand acres.