Lynch Gulch
Environmental Assessment

NEPA Register Number: DOI-BLM-ID-C010-2015-0004-EA

U.S. Department of the Interior
Bureau of Land Management
Coeur d'Alene Field Office
3815 Schreiber Way
Coeur d'Alene, ID 83815
208-769-5000

May 2016

Contents

1.0 Introduction 3
2.0 Purpose and Need: 3
3.0 BLM Decision to be Made: 4
4.0 Land Use Plan Conformance: 5
5.0 Scoping and Issues 7
6.0 Alternatives 9
7.0 Affected Environment and Environmental Effects 12
7.1 Scope of Analysis 12
7.2 Forest Vegetation: 13
7.3 Vegetation Communities, including Special Status Plant Species: 16
7.4 Fuels 31
7.5 Cultural Resources 35
7.6 Aquatic/Special Status Species: 36
7.7 Invasive, Nonnative Species (Weeds): 39
7.8 Wildlife/Habitat and Special Status Wildlife/Migratory Birds: 41
7.9 Air Quality 58
7.10 Soil Resources 64
7.11 Water Resources: 66
7.12 Visual Resources 68
7.13 Social/Economic Conditions: 69
7.14 Recreation 71
8.0 Tribes, Individuals, Organizations, or Agencies Consulted 73
9.0 List of Preparers 73
10.0 References Cited 74
11.0 Attachments 81

1.0 Introduction

1.1 Background:

The forest vegetation on BLM land in the Lynch Gulch area south of the town of Pinehurst, in Shoshone County Idaho, is overstocked with numerous understory trees. These overstocked understory trees threaten the large overstory ponderosa pine, white pine, and western larch with fire by providing a way, or "ladder fuels," for a ground fire to reach the crowns of the overstory trees. The combination of the overstocked understory and scattered dead lodgepole pine and dead fir trees infected with root rot also creates a fire hazard to the wildland urban interface (WUI) with the town of Pinehurst.

1.2 Proposed action summary:

The BLM proposes to implement a timber sale and prescribed burn to reduce the wild land fire threat to the local community and infrastructure in the Lynch Gulch area.

1.3 Location:

Shoshone County - Approximately 1/2 mile SSE of Pinehurst, approximately 1/2 mile from Barkerville (Jct. of Pine Creek and the West Fork of Pine Creek) at T.48N., R.2 E. Sections 8, 17, 20, 21, 28 and unsurveyed sections (see Map 1).

2.0 Purpose and Need:

2.1 Need:

The present composition of the forest stands near the community of Pinehurst are overstocked, creating hazardous fuel loading and forest health problems. The combination of blister rust, mountain pine beetle, and root rot have and will continue to kill trees within these stands. These conditions increase the potential threat of stand replacing wild fires.

The forest vegetation communities are not within the appropriate fire regime condition class (FRCC) due to past fire suppression practices. The FRCC refers to the degree of departure from the natural fire regime and its subsequent effect on vegetation composition and structure on a landscape scale. Approximately 64 percent of the project area is FRCC 2 and 31 percent FRCC 3. FRCC 2 is a moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances. FRCC 3 is defined as having high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and predispose the system to high risk of loss of key ecosystem components.

The project area is within the wildland-urban interface (WUI) area of Pinehurst. One of the goals identified in the Coeur d'Alene Resource Management Plan (RMP) (BLM 2007), is to "protect life and property while returning fire to its natural role in the ecosystem." The RMP further states that one of the specific objectives for achieving

this goal is to “Reduce impact from wildland fire to WUI areas, municipal watersheds, and infrastructure.” In addition, the Shoshone County, Idaho Community Wildfire Protection Plan identifies the proposed project area as high priority for hazardous fuels treatments.

The RMP further states that “When applying treatments in the vicinity of old growth stands, ensure that these treatments will fully maintain or contribute toward the restoration of the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account:

- Contribution of the stand to landscape fire adaptation and watershed health; and
- Retaining the large trees contributing to old growth structure in accordance with the Healthy Forests Restoration Act.”

The RMP also includes a goal to “provide forest products (saw logs, biomass, firewood, hog fuel, etc.) to help meet local and national demands while protecting the natural component of the environment.”

2.2 Purpose:

The primary purpose of the proposed action is to comply with the above goal, objective, and implement the direction from the RMP. Specific objectives for the project are:

- Reduce the potential impact from wild land fire to WUI areas and infrastructure while returning fire to its natural role in the ecosystem within the Pinehurst area.
- Lessen the risks to fire fighters by providing a “foot hold” area (ie. harvest units, shaded fuel breaks) where they can anchor the fire line during fire suppression actions.
- Reduce the risk to old growth ponderosa pine trees of fire-caused mortality.
- Provide forest products and related economic benefits while protecting cultural and natural resources for the good of the public.
- Improve Forest Health and restore forest stands to historic species composition, structure, and function.
- Improve the FRCC across the landscape by reducing hazardous fuel loads and reintroducing fire.

3.0 BLM Decision to be Made:

The BLM will decide where and what vegetation treatments to implement, and whether or not to conduct a timber sale in accordance with 43 CFR 5000 after the analysis has been completed.

4.0 Land Use Plan Conformance:

The proposed action as described in Section 6 of this EA is in conformance with the Coeur d'Alene Resource Management Plan, approved June, 2007 (BLM, 2007). The following objectives and actions support the proposed action.

Goal WF-1- Protect life and property while returning fire to its natural role in the ecosystem.

Objective WF-1.5 – Improve or protect valuable resources and improve the FRCC through the use of fuels treatment activities within the 8,200 acres where vegetation treatments will occur.

Action WF-1.5.3 – Fuels treatments (prescribed fire, mechanical, chemical, or biological) will be conducted on identified areas.

Action WF-1.5.4 – Coordinate fuels treatment activities with adjacent land owners and other management agencies.

Objective WF-1.6 – Reduce impact from wildland fire to WUI areas, municipal watersheds, and infrastructure.

Action WF-1.6.3 – Conduct mechanical fuels treatments on identified areas.

Action WF-1.6.5 – Coordinate fuels treatment activities with adjacent land owners and other management agencies.

Goal VF-1- Restore forest vegetation towards historic species composition, structure, and function across the landscape.

Objective VF-1.2 – Restore forest stands to historic species composition, structure, and function by conducting vegetative treatments.

Action VF-1.2.1 – Emphasize the use of natural disturbances, prescribed fire, and appropriate silvicultural methods to restore historic composition within wet/warm vegetation cover type.

Action VF-1.2.2 – Emphasize the use of natural disturbances, prescribed fire, and appropriate silvicultural methods to restore historic composition within dry vegetation cover type.

Action VF-1.2.3 – Emphasize the use of regeneration harvest and natural and artificial regeneration to restore historic composition within wet/cold vegetation cover type.

Action VF-1.2.6 – Restore forest structure and function by reducing tree density and brush/shrub competition using appropriate silvicultural treatments including, but not limited to, intermediate treatments, release treatments, use of pesticides, and prescribed burning. Aerial spraying to control brush/shrub competition will not occur. Prioritize these treatments within FRCC 2 and FRCC 3 areas (16).

Objective VF-1.3 – Maintain or enhance wildlife habitat function through the above objectives and actions, and in accordance with the goals, objectives, and actions listed in the Fish and Wildlife and Special Status Species sections.

Goal TM-1 – Provide adequate administrative access for resource management needs and appropriate public access to recreation opportunities on BLM – managed or partnered lands and waters.

Goal FP-1- Provide forest products to help meet local and national demands while protecting natural component of the environment.

Objective FP-1.1- Provide a probable sale quantity (PSQ) of 4.4 million board feet per year (MMBF/year) over 15 years of commercial forest products (e.g., saw timber, hew wood, pulp, fuel wood, biomass, etc.) from vegetation treatments designed to improve forest health on at least 8,200 acres.

Action FP-1.1.1 – Identify and treat areas to promote forest health and restore forest stands to historic species composition, structure, and function by:

- Retaining large diameter trees when consistent with treatment objectives.
- Treating areas with excessive forest fuel loading and ingrowth.
- Treating areas with insect and disease infestation.
- Treating areas where other disturbances have occurred (45).

Goal FW-1 – Manage aquatic, riparian, and wetland habitats to provide for a natural abundance and diversity of fish and wildlife with self-sustaining populations in northern Idaho.

Objective FW-1.1 - Promote recovery of aquatic, riparian, and wetland habitats, including maintaining/improving watersheds.

Action FW-1.1.1- Establish Riparian Conservation Areas (RCAs) consistent with riparian management objectives (RMO) and standards and guides (S&G) in the Coeur d'Alene native fish strategy (CNFISH).

Goal FW-2- Provide terrestrial habitats for a natural abundance and diversity of native and desirable nonnative wildlife species with self-sustaining populations in northern Idaho.

Objective FW-2.2- Maintain adequate habitat for snag- and cavity-dependent animals, with emphasis on migratory birds, waterfowl, and bats.

Action FW-2.2.4- Retain snags ≥ 14 inches diameter at breast height (dbh) (or largest available) according to the following:

Table 4.0: Snag Retention

Cover Type	Snags/acre
Wet Cold Conifer	8.1
Dry Conifer	3.3
Wet Warm Conifer	5.4

Goal SS-2 – Ensure that BLM-authorized actions are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species under provisions of the Endangered Species Act (ESA).

Objective SS-2.5 – Ensure that rare plant populations/associated habitats and rare plant communities are stable or continue to improve in vigor and distribution.

Action SS-2.5.3 – Appropriate mitigation/guidelines (e.g., avoidance of occupied areas, distances from occupied habitat) will be designed when a project occurs near special status plant population(s).

Action SS-2.5.6 – Prioritize weed control at special status plant populations threatened by weed infestation. Methods of weed spraying within or near habitat will be formulated on site-specific and species-specific basis.

Action SS-2.5.7 Seeding within occupied habitat will be avoided unless clearly beneficial for special status plants.

Goal SE-3 - Provide opportunities for economic benefits while protecting cultural and natural resources.

Objective SE-3.1- Balance resource protection with opportunities for commercial activities and other noncommercial human uses (65).

5.0 Scoping and Issues

5.1 Public Involvement:

Shoshone County Commissioners, local residents who live within the project area and interested parties received written notification about the proposed action. The public comment period extended from 5/11/2015 to 6/12/2015. During the comment period one comment was received expressing concerns over motorized vehicle use, the need for a shaded fuel break on Bobby Anderson ridge and protecting riparian conservation areas.

5.2 Issues:

The table below describes the issues identified through internal and external scoping which will be analyzed in detail in this EA:

Table 5.2: Issues Analyzed

ELEMENT/RESOURCE/USE	Issue Statement(s)
Forest Vegetation	The project would change the composition, structure and functions of the existing forest vegetation possibly affecting large old trees.
Vegetation/Special Status Plants	Sensitive plants could be damaged by logging or Rx burning.
Wetlands and Riparian Zones	Aquatic habitat could be damaged by road construction, logging or Rx burning.
Invasive, Nonnative Species	Disturbance to soil could provide opportunities for invasive plants and noxious weeds to spread.
Wildlife/Habitat	Increased recreational use could potentially disturb wildlife and degrade habitat. Forest vegetation removal could decrease cover for big game.
Special Status/Migratory Birds	Bird nesting sites could be damaged.
Air Quality	Prescribed burning would produce smoke that could affect regional air quality. Pinehurst is a non-attainment area for smoke.
Fuels	Is a shaded fuel break necessary in coordination with harvesting and prescribed burning activities.
Soil & Water Resources	Disturbed soils could produce sediment that may enter the creek.
Recreation	Project work could impact recreational use of public lands.
Cultural Resources	Logging near historic adits could disturb cultural resources.
Social/Economic Resources Conditions	Residents living next to the project could be adversely affected by the project, i.e. noise and traffic.

6.0 Alternatives

This chapter is a description of each alternative and summarizes the environmental consequences of the alternatives

This EA contains the analysis of a proposed action alternative and a no action alternative. For an ID team to consider an action alternative, that alternative must meet the purpose and need and be in conformance with the RMP (RMP 2007).

For proposed harvest area locations, refer to the attached Map 2, Treatment Areas. Appendix D of the RMP describes the best management and conservation practices for harvest related activities while Appendix E describes the silvicultural objectives of commercial thinning and fuels reduction (RMP 2007).

All quantifications (i.e. acreages, mileages, etc.) used in the descriptions of the alternatives are based on estimates obtained from geographic information systems (GIS). In implementing these plans in the field, final numbers could vary slightly. Harvest volumes for the commercial thinning are estimates derived from stand exam information and model projections. These volume estimates are variable and actual volume harvested may differ.

6.1 Alternative A (Proposed Action):

6.1.1. General Description:

The proposed timber sales and hazardous fuel reduction actions would be located between Little Pine Creek and Pine Creek south of the town of Pinehurst Idaho in Shoshone County. The majority of the action would occur along the major ridgeline of Bobby Anderson ridge (See Map 1: Lynch Gulch - Project Area).

The BLM proposes to harvest about four million board feet of timber by thinning understory trees on 746 acres within the 2,018 acre project area of forested public land and to create a shaded fuel break along Bobby Anderson ridge approximately 400 feet wide (120 acres) (See Map 2: Lynch Gulch - Treatment Areas). Fuel reduction and vegetative treatments would include removal of dead and dying trees from the forest, commercially thinning understory trees in mixed conifer stands, and prescribe burning in ponderosa pine forests. Fuels treatments consist of biomass utilization, piling and burning, slashing, and prescribed burning. Following timber harvest, the BLM would underburn approximately 520 acres of forested land to reduce slash and natural fuels that threaten ponderosa pine stands. The existing road system (5.7 Miles) would be upgraded to facilitate access by heavy equipment and the hauling of logs to facilitate harvest operations. One mile of new permanent road, and one and a half miles of temporary new road would be constructed. The BLM would install gates, barriers or obliterate roads to implement road closures on temporary roads to block post-treatment motorized travel, limiting wildlife disturbance following harvest and fuel reduction

actions. By decommissioning roads that already exist in the project area it would create a net road loss in the project area of 0.5 miles decreasing motorized road use after treatment.

The project would be implemented in multiple phases with two separate timber sale contracts. The BLM anticipates two three-year timber sale contracts that would begin in July of 2016. Prescribed burning would take place when weather conditions allow for meeting objectives while minimizing smoke impacts.

The Proposed Action would:

• Construct approximately one mile of permanent roads and construct approximately one and a half miles of temporary road which would be decommissioned at the end of the project;

• Decommission approximately one and a half miles of existing roads;

• Thin the forest by harvesting trees located on 746 acres of forested land, which could produce about four MMBF of timber;

• Conserve old ponderosa pine and Douglas-fir trees located on southern aspects by thinning understory fir and pine trees;

• Conserve old western white pine, old western redcedar, dominant overstory western larch and Engelmann spruce trees located on northern aspects by thinning understory trees;

• Conserve all active raptor nests with a 100 yard buffer;

• Establish approximately a two and a half mile long shaded fuelbreak along the Bobby Anderson Ridge to aid in future fire suppression efforts;

• Restore fire adapted ecosystems and reduce hazardous fuels by prescribed burning on 520 acres;

• Restore forest stands to historic species composition by planting disease resistant western white pine and western larch seedlings in openings created by logging or prescribed burning on the wet/warm vegetative cover types, and by planting ponderosa pine seedlings in openings created by logging or prescribed burning on the dry conifer vegetation cover type;

• Implement hazardous fuels monitoring on treatment units;

• Implement wild fire effectiveness monitoring of the project.

6.1.2. Environmental Design/Resource Protection:

Retention forestry would be applied to ponderosa pine trees over 100 years old that are located on south facing aspects. Old western redcedar trees would be retained on the project area as much as possible.

Riparian conservation areas would be established on all perennial and intermittent streams in the project area to maintain water quality and reduce the potential for sediment to reach the creek. Additionally, the majority of the constructed roads would be about quarter mile away from any streams.

Large blocks of forest reserve areas within the project area would be conserved to minimize disturbance to wildlife populations. All known or discovered wetlands, seeps, bogs, elk wallows and springs less than one acre in size would be protected with a 100-foot "no activity" buffer along their perimeters.

The timber harvest activities would minimize impacts to soil and water quality through contract stipulations and best management practices (BMPs), including: restrictions on operating when soil moisture is greater than 25%, proper spacing of skid trails; limiting tractor skidding to slopes of 45% or less, and installing waterbars and other drainage measures as recommended by the BLM. BLM project inspectors would be on site during construction activities to ensure that proper procedures are followed. All disturbed ground would be re-vegetated as soon as possible with the BLM approved seed mix. To reduce sources of noxious/invasive seed and/or plant parts and minimize risk of spreading existing infestations, pre-existing weed populations would be treated prior to project activities.

Preventing new weeds species from entering the project area is the highest priority for protecting the area from weed invasion. Pre-harvest measures would include removing all mud, dirt, and plant parts from all off-road vehicles and off-road equipment before entering BLM lands. Cleaning must occur off BLM lands. (Cleaning requirements do not apply to vehicles that would stay on the established roadway and use the constructed landing. These areas are more easily monitored and treated if weed establishment occurs.)

Opportunities for weed invasion in disturbed sites would be reduced by seeding all disturbed soil (except the travel way on surfaced roads) in a manner that optimizes plant establishment for that specific site. A certified weed-free seed mix that includes fast-growing, early season species would be used to provide quick, dense re-vegetation.

Reduce impacts of weed populations following project completion. Post-harvest activities would employ an integrated weed control strategy of: monitoring and treatment of weed infestations on off-highway vehicle (OHV) trails, roads, landings, skid trails, and treatment areas. Weed treatments will use biological controls, mechanical removal, and/or herbicides after considering the effectiveness of all potential methods and combination of methods. Road and trail closures would reduce the likelihood of weed introduction, spread and persistence in these areas.

Work on the project area would be accomplished with care to ensure that no oil, diesel, gas or other harmful materials foul the soil or enter any stream.

All burning would be in conformance with air quality regulations, and coordinated with the North Idaho Airshed Group to maintain air quality. BMPs would be applied to reduce effects from road dust, i.e. road watering.

To maintain adequate habitat for snag and cavity dependent animals about five large snags or cull trees would be retained per acre for wildlife on north facing aspects and

about three large snags or cull trees would be retained per acre for wildlife on south facing aspects.

About eight logs/acre would be retained on north facing aspects to provide or improve grouse habitat, and about four logs/acre would be retained on dry conifer forests.

To protect raptors and their habitats, if an active nest is found a 100-yard buffer around the nest would be implemented.

To protect migratory birds, timber harvest and road construction activities will be limited to 20 percent of the harvest area during the breeding season when a majority of birds are nesting from April 1st to July 15th. The areas to be opened will be determined by the Project Lead and the Wildlife Biologist with approval of the Field Manager.

To ensure scenic quality objectives are met, the location of the proposed roads and silviculture prescriptions for timber harvest would conform to the natural landscape.

To help protect soil, the contractor would have the option to log the area when the ground is frozen with at least 12 inches of snow cover.

All snags greater than 16" dbh will be retained unless determined to be unsafe by the Project Lead, Contracting Officer's Representative (COR), or the Contractor.

Fire wood cutting by the contractor of their crew will be monitored and administered by the Project lead or COR and will be limited in areas where downed-woody-debris is lacking.

Harvest areas on the east side of the ridge will have a 100 foot feathered edge with a higher retention of trees to increase cover for big game species.

6.2 Alternative B(No Action):

No treatment would occur under the no action alternative. This alternative would not meet the purpose and need.

The project area would not receive the treatments described in this document in the near future. Ongoing activities would continue to occur under both the no action and the proposed action. These include silvicultural activities in young stands, compliance with Community Wildfire protection plans, routine road maintenance, control of noxious weeds and other projects covered by earlier decision records.

7.0 Affected Environment and Environmental Effects

7.1 Scope of Analysis

7.1.1 General Setting

The town of Pinehurst is about a half mile northwest of the project area boundary and the town of Barkerville is about a half mile west of the project boundary. The project area lies between the East Fork of Pine Creek and Little Pine Creek; situated on either side of Bobby Anderson Ridge and Pine Point. Elevations in the project area range from

about 2,800 feet to 4,500 feet. The project is located on both north and south aspects, and about 60% of the area is on slopes greater than 45%.

Since the early 1990s aerial insect and disease timber survey data has been collected by the USFS that indicates significant mortality from various insect attacks and diseases of which the mountain pine beetle and *Armillaria mellea* root disease are most active on the project area.

The majority of the forest in the project area was established after the 1910 wildfire. Historically, fires have played an important role in the ecosystem. Fires have provided repeating cycles of disturbance which create openings that enhance soil moisture, increase sunlight and nutrients providing habitat for disturbance adapted plants and animals, thus resetting succession. Due to the increase in home sites within the Wildland Urban Interface, naturally occurring fires have been suppressed throughout much of the West, including the project area. This has created an accumulation in fuels and allowed succession to near climax with less fire resilient species growing in the forest.

7.1.2 Related Past, Present, and Reasonably Foreseeable Actions

Human caused and natural events have had varying levels of impacts on the resources and values affected by the proposed forestry project. The only BLM action within the project area was a small partial cut in 1960 and another in 1963 producing approximately 100,000 bf.

Other past, present and reasonably foreseeable actions and events that contribute to the analysis of cumulative impacts to resources include past road building and continuing OHV trail use; past and future timber harvest on private land; fire activity; insect and disease outbreaks; and house construction.

7.1.3 Analytical Assumptions

The analysis is based on the following assumptions:

- Since the majority of the private forest land has already been harvested, near-future timber harvests on these lands and construction of associated new roads is unlikely.
- Use of unimproved roads in the vicinity of the project area will continue to be light.
- If left untreated, a stand replacing crown fire will occur in the project area in the future.

7.2 Forest Vegetation:

7.2.1 Affected Environment:

There is considerable diversity in the forest setting because the project area is located on both north and south facing slopes. There are three principal forest cover types on the project area and are represented in a vegetative mosaic across the area. Generally, south and east facing aspects sustain both dry conifer cover types (943 acres) and wet warm conifer cover types (471 acres), north and west facing aspects sustain Wet cold

conifer cover types (252 acres)(see Map 5: Lynch Gulch– Forest Cover Type for locations).

The project area appears to not have sustained a significant wildfire since the 1910 fire. Fire scars on large trees throughout the project area appear to be greater than 100 years old.

Shade intolerant shrub and herbaceous growth is vigorous where the forest canopy is more open, in contrast to deeply shaded areas with sparse understory vegetation.

Vegetation within the project area has been disturbed by recreational use of roads and trails; fire activity; insect and disease outbreaks; logging; road building and/or maintenance; and mining.

Several of the entomological and pathological agents are active in the project area as discussed below

:

Mountain Pine Beetle

Mountain pine beetle is a native bark beetle with a one-to-two year life cycle that affects ponderosa pine as well as other pines. Adults select green trees of sufficient size and phloem thickness to nourish their larvae. The pitch tubes on the bole and boring dust at the base of the tree are evidence of beetle entry. Beetles are subject to mortality from parasites, predators such as woodpeckers, cold winters, drying of the pine following infection, and resin from the host tree. In lodgepole pine stands, infestations tend to occur in stands with basal area (BA) above 120 ft^2 per acre and also on poor sites. Thinning can help reduce susceptibility to mountain pine beetle. Thinning to residual BA of 80 ft^2 per acre is recommended by scientists (Mitchell, Waring, Pitman 1983).

Pockets of mountain pine beetle killed trees have been noted in the project area primarily affecting the concentrations of small diameter lodgepole pine trees.

Root Diseases

Root diseases are slow spreading insidious fungi that can affect all sizes, ages and species of trees. In the watershed, grand fir and Douglas-fir are most highly susceptible and the prevailing root pathogens affecting them are armillaria and annosus root rots. With the continued exclusion of fire, grand fir and Douglas-fir will increase, and root disease will likely also increase. However, this change is not toward conditions outside historic ranges. Where Douglas-fir has encroached on ponderosa pine stands, these will be more susceptible to root disease. Fire and root disease appear to have contributed historically to the maintenance of larch in mixed conifer stands. Without fire, root disease is unlikely to sufficiently limit grand fir competition leading to the eventual elimination of larch from the stand.

Root disease has probably increased in severity. The older a stand becomes and the more it shifts toward grand fir, the more severe root disease will be. Root disease may play a more important role if ponderosa pine is reduced and Douglas-fir and grand fir increase. It will affect canopy cover, cover types, size, and age distribution of trees, and

timber productivity. The effects will be to create forest openings, favoring shrubs and regeneration of more susceptible grand fir or increased dominance by less susceptible species. Over the long-term, without fire or harvest to sustain less susceptible species, more stands will become susceptible.

7.2.2 Environmental Effects from Alternative A (Proposed Action):

The Proposed Action would transition forests closer to their pre-settlement species mix, density, structure, and diversity so it could be more resilient and resistant to the effects of insects, disease, and wildfire (Fulé 2001; Graham 2004). Pre-settlement fire behavior at lower elevations would have typically been low intensity, frequent understory burning in the western white pine, ponderosa pine and Douglas-fir forest types.

Harvest Operations

The amount of change in forest composition and structure of the treatment units would be related to species' retention priorities, diameter cut limits, and reforestation objectives. Removal of small diameter trees, in-growth and intermediate and suppressed trees growing into the crowns of healthy dominant and/or co-dominant trees would occur. Group selection harvest of trees affected by insects and disease would visibly change the current forest structure, as well as reduce competition with retention trees for water, sunlight, and nutrients. Reducing the average number of trees per acre would open the forest canopy, with openings initially dominated by shade-intolerant shrub and herbaceous species, until re-planting or natural regeneration of trees occurs. Retention and management of larger diameter trees would further develop the large tree structural component. Retaining larger woody debris on the forest floor would be important for tree seedling establishment, soil carbon cycling, nutrient and water storage, and wildlife activity.

On the acres designated for cable logging, vegetation would be injured or killed where the cable tower system is set up, along the cable corridors themselves, where individual trees are cut, and where trees are stockpiled for loading onto logging trucks. Logging with ground-based equipment would cause the ground disturbance and injury to plant communities in the action area. However, measures such as restricting skid trails to certain spacing intervals and widths could concentrate the most intense impacts into certain areas, helping reduce more widespread disturbance to vegetation due to skidding activities. Impacts to vegetation also could be reduced if tractor operations occurred on frozen ground with 12 inches of snow cover.

Reforestation

Planting blister rust resistant western white pine seedlings would aid re-establishment of diverse, resilient, and/or resistant forest vegetation in the project area. However, managing for seral tree species would require subsequent actions to discourage re-growth of tree species (such as grand fir and Douglas fir) that may dominate sites to which they are adapted where natural disturbance regimes have been altered. After the

planned prescribed burn the timber harvest area will be evaluated to determine if seedling planting is needed. If reforestation is needed blister rust disease resistant western white pine seedlings and western larch seedlings would be planted on the north facing aspects, south facing aspects would be planted with ponderosa pine.

7.2.3 Environmental Effects from Alternative B (No Action):

Plant succession would continue toward the potential natural community where possible, in the absence of disturbance. Over time, sites in the area capable of supporting more dense forest vegetation would be dominated by shade-tolerant species, until a future disturbance such as logging, wildland fire, insect infestation, or disease creates openings in the forest. Undesirable numbers of Douglas fir, grand fir, and lodgepole pine vulnerable to insect and disease outbreaks would continue to compete with western larch and western white pine. Impacts to common, native plant communities due to a wildfire may be more severe due to the amount of fuel accumulated in unthinned areas, and possibly spread beyond the boundaries of the proposed action. A wildfire has the potential to be stand-replacing but may also create a mosaic of burned and unburned vegetation, depending upon variation in fire behavior.

This alternative would cause fewer disturbances to native plant communities in the action area, compared to the proposed action.

7.2.4 Cumulative Effects:

Within the project area the majority of the private land has been harvested to salvage trees dying from insect attacks and root disease thereby decreasing the mortality risk on private lands. On BLM managed lands mortality from trees dying from insect attacks and root rot disease is ongoing and will continue to occur if no action is taken. Old growth ponderosa pine trees are currently dying, and mortality would increase due to moisture stress from the understory trees. The crown fire risk would increase over time as limbs of the understory trees reach into the crowns of the overstory old growth trees. Overall, the forest would transition into an unhealthy condition. The proposed action would bring the fire and disease risk on BLM lands closer to the condition of adjacent private lands.

7.3 Vegetation Communities, including Special Status Plant Species:

7.3.1 Affected Environment:

A mosaic of plant communities currently grows in the project area, primarily due to differences in plant growth requirements; soil type/geology; a steep elevational gradient; changes in slope aspect; and disturbance history, particularly fire, logging, and mining including smelter emissions. Review of aerial photos of Pine Point ridge and adjacent Pine Creek from the 1930s and 1968 show vegetation cover that is quite different from the current condition seen in Map 5:Forest Cover Type.

The driest sites on Pine Point ridge support primarily shrub and herbaceous plants, with only widely-spaced trees present, though tree density is increasing, as the interval between disturbance events has lengthened. In general, warm, dry forest habitats in the project area are dominated by a mixture of ponderosa pine, Douglas fir, and shrubs and herbaceous species typically found in northern Idaho. However, where ecological succession has resulted in more moderate forest stand conditions, especially as the tree canopy moves toward closure, species with a higher moisture requirement, such as grand fir, have successfully established. Plant density also has increased where the fire return interval has lengthened, resulting in more ingrowth of small-diameter trees and shade tolerant species. (Figure 7.3.1) These habitats are also the most vulnerable to invasion and spread of weeds, which compete with native species for light, water, nutrients, or pollinators. Section 7.2.1 describes the existing condition and trend of invasive species in the project area.

Figure 7.3.1. Larger diameter ponderosa pine trees surrounded by ingrowth.

Project area forest communities that occupy warm, moist sites are characterized by the presence of grand fir, western redcedar, western hemlock; and associated shrub and herbaceous species. Where succession has re-started after recent disturbance, such as a fallen tree, these areas may have become quite dense with sapling and pole-sized trees as well as site-adapted shrubs. (Figure 7.3.2)

Figure 7.3.2. Western redcedar regeneration in warm, moist forest habitat

Proposed harvest units on the north and east sides of the main Pine Point ridgeline contain an impressive example of large, dominant western white pine and western larch trees, similar to what used to occur in northern Idaho forests, prior to the advent of an introduced blister rust species, high-grade timber harvest, and the development of organized and highly successful fire suppression efforts. (Harvey et al. 2008, USDA Forest Service 2015) (Figure 7.3.3) These two species were important historically in northern Idaho, forming a stable, relatively long-lived, mixed species forest that was perpetuated by a combination of mixed-severity and stand-replacing wildfires (Zack and Morgan 1994). While some of the white pine and larch trees in these project units are clearly affected by disease, and/or possibly insects, certain larger individuals appear to have avoided or resisted attack. The structure of the stands (Figure 7.3.4) is slowly moving toward a later stage of succession, similar to what is depicted in Figure 7.3.5, with increased canopy closure, dominance by Rocky Mountain maple, decrease in low shrub cover, and shift in herbaceous species toward those thriving in shadier conditions.

Figure 7.3.3. Large diameter western white pine in McKinley Gulch.
Individual in photo is 6’1” tall.

Figure 7.3.4. Example of dominant western white pine, western larch, & stand structure in northernmost harvest unit.

Figure 7.3.5. Interior of a western white pine old-growth stand, 1935.
(USFS Photo from Harvey et al. 2008)

Idaho BLM Special Status Plants

The Idaho Natural Heritage Program database was searched for known occurrences of rare plants in the project area. Field work has been done the past two years in Lynch Gulch and the surrounding area.

No water howellia (*Howellia aquatilis*-threatened) individuals, populations, or potential habitat occur in the project area.

No individuals or populations of Spalding's catchfly (*Silene spaldingii*-threatened) were found in the project area, although suitable habitat occurs in the grass-dominated and open Ponderosa pine communities on the Pine Point ridgeline. (USFWS 2007) Shrubs and trees are invading portions of this habitat due to a change in the natural disturbance regime, which has allowed ecological succession to proceed. These drier habitats also have been invaded by weeds, usually where disturbance has occurred.

Though a very small amount of subalpine habitat is present in the project area, no whitebark pine (*Pinus albicaulis*-candidate) trees were found.

Bank monkeyflower (*Mimulus clivicola*) is a member of the figwort or snapdragon family. A population has been documented upstream of the project area in the West Fork Pine Creek drainage. This is a tiny annual plant found only in north and central Idaho, and far eastern Oregon. This species generally occupies sunny, steep slopes, growing on bare mineral soil among shrubs and scattered trees. Bank monkeyflower appears to be somewhat tolerant of smaller-scale disturbance such as that which is associated with

game trails. No bank monkeyflower individuals or populations have been found in the project area, but potential habitat occurs in the grass- and shrub-dominated plant communities and driest, open forest stands. (Lorain 1991)

Clustered lady's-slipper (*Cypripedium fasciculatum*) is a perennial, terrestrial, wild orchid. A small population has been documented in the Silver Valley outside of the Pine Creek drainage. In Idaho, this species usually blooms from May through June. Clustered lady's-slipper mainly grows in shaded, moist to dry western redcedar forests and occasionally in grand fir forests. Two populations located in the vicinity of Coeur d'Alene indicate that this species can also occur underneath larger shrubs in drier seral stands of Douglas fir. This species grows from elevations of 1,700 to 4,600 feet. No clustered lady's-slipper individuals or populations occur in the action area, though potential habitat is present within the Douglas-fir, grand fir, western redcedar and western hemlock communities in the project area. (Lichthardt 2003, Hammet 2008)

Constance's bittercress (*Cardamine constancei*), a perennial herb, is a member of the mustard family. Its global distribution is restricted to north-central and northern Idaho. This species primarily reproduces vegetatively, since it does not tend to flower under dense tree canopy where it often grows. When exposed to increased sunlight, plants bloom from May to June, but most developing fruits are aborted by mid-July. Constance's bittercress is generally found in lower elevation moist forests, especially in western redcedar- and western hemlock-dominated riparian areas. It does appear to be favored by light disturbance and thinning of the canopy. Constance bittercress plants have been found just west of the project area in McLaren Gulch and near the former Amy Millsite; and in the lower Hunter-Trapper drainage, a tributary of the East Fork Pine Creek. (USDA Forest Service 2006)

Deerfern (*Blechnum spicant*) is a perennial, evergreen fern, which usually grows in moist, shaded forests. This is a wide-ranging species, occurring in the boreal regions of both western and eastern hemispheres. In North America, deerfern is chiefly found west of the Cascade Mountains of the Pacific Northwest but does extend south into northern California. Disjunct populations are known from northern Idaho, including the South Fork Coeur d'Alene River drainage. No deerfern individuals or populations occur in the project area, though potential habitat occurs in the drainages on the north and east sides of the main ridgeline. (USDA Forest Service 2015)

Pine broomrape (*Orobanche pinorum*) is a plant that lacks chlorophyll and obtains its nutrients by parasitizing other plants. It occurs only in western North America, from northern California to Oregon and north to central Washington and through northern Idaho (Ellis et al. 1999). Pine broomrape is uncommon throughout Idaho, Washington, and British Columbia but is apparently secure in Oregon. In Idaho, it is a root parasite of oceanspray shrubs (*Holodiscus discolor*). (NatureServe 2015) Two small occurrences of this plant have been found in the project area.

7.3.2 Environmental Effects from Alternative A (Proposed Action):

Vegetation Communities

The proposed action would change the species composition, vertical structure, and density of forest vegetation on approximately 746 acres through harvest, thinning, mechanical fuels treatment, burning, and reforestation.

Harvest Operations, Thinning, and Mechanical Fuels Treatment

Some site vegetation would be killed (for example, trees that are cut; ingrowth that is thinned) or injured during project operations (for example, retention trees marred by logging equipment or by felling activities). Reducing the average number of trees per acre in the project area would open the forest canopy and favor plant species adapted to warmer, drier growing conditions, while other shade-tolerant plant species would be negatively impacted, such as by sun scalding. (Hagle et al. 2003) Thinning dense trees would reduce the intense competition for water, sunlight, and nutrients which the desired tree species and size classes are currently experiencing. Conifer tree species composition would shift toward those species favored for retention, as described in the Proposed Action, and toward those early seral species that would be planted during reforestation efforts. Shade intolerant vegetation species would proliferate in the gaps between trees following treatment, until altered by ecological succession or future disturbance. (Cooper et al. 1991, USDA Forest Service 2015) Due to succession, the ridgeline, shaded fuelbreak would require periodic thinning of the understory to help retain its fire-break characteristics. The larger diameters western white pine and western larch on the north and east sides of the main ridgeline are fire-dependent, seral species. Historically, periodic, stand-replacing fire or other disturbance occurred to remove competing vegetation and allowed western white pine and western larch to establish and persist (Cooper et al. 1991, USDA Forest Service 2015). Because the natural fire regime has been disrupted in the project area, harvest, thinning, and mechanical fuels treatment would be used to re-create the stand conditions which favor these two species. (BLM 2007)

Removal of smaller diameter tree in-growth and intermediate and suppressed trees, as well as the salvage harvest of trees affected by insects and disease, would visibly change the current forest structure. Retention and management of larger diameter trees would maintain and develop the large tree structural component, especially in the units where large ponderosa pine, western white pine, and western larch trees are already present. Where thinning occurs, spacing between residual trees would reduce crown contact, and would create openings initially dominated by shade-intolerant shrub and herbaceous species, until re-planting or natural regeneration of trees occurs. Retaining larger woody debris on the forest floor would be important for tree seedling establishment, soil carbon cycling, nutrient and water storage, and animal activity. The post-treatment structure of harvested and thinned areas would change as ecological succession proceeds or when a future disturbance occurs. (Cooper et al. 1991, Smith and Fischer 1997, BLM 2007)

On the 736 acres designated for cable logging, vegetation would be injured or killed where the cable tower system is set up, along the cable corridors themselves, where individual trees are cut, and where trees are stockpiled in landing areas. Logging with ground-based equipment on 10 acres would cause more ground disturbance and injury to plant communities, when compared with cable logging. However, measures such as restricting skid trails and yarding corridors to appropriate spacing intervals, respectively, and minimum necessary width, plus using designated landings, would concentrate the most intense impacts into certain areas, helping reduce more widespread disturbance to vegetation. Impacts to vegetation also could be reduced if tractor operations occurred on two feet or more of snow; even operating over frozen, snow-free ground probably would not reduce damage to the above ground portions of non-target understory plants.

Removal of trees within root disease "centers" can intensify the disease through fungus colonization of stumps and roots of harvested trees. These areas then provide food bases for a pathogen, allowing it to infect and kill other nearby trees. However, without any management actions, root disease centers continually regenerate with brush species followed by susceptible tree species, which are subsequently killed at relatively young ages. Not all conifer tree species are equally susceptible to root disease; therefore, planting disease tolerant species in root disease areas following harvest would help break the cycle of continued regeneration of susceptible tree species and return productivity to the site. This strategy promotes restoration of disease-resistant species composition in the project area by favoring trees that are less susceptible to root disease, such as ponderosa pine, western larch, and western white pine. (Idaho Dept. of Lands 2015)

Vegetation and ground disturbance associated with harvesting and mechanical fuels treatment would create sites favorable for weed invasion and would produce conditions that allow more sunlight to reach the forest floor. Therefore, weeds, which currently occupy sites in or adjacent to the units and tend to do extremely well in warmer, drier environmental conditions, may spread or at least maintain their present level of infestation. However, inventory, treatment and monitoring of the project area and access roads would reduce potential impacts to native vegetation from weeds. Treatment of project-related noxious weed infestations, especially, would assist re-establishment of native vegetation in disturbed areas by reducing competition for sunlight, water, nutrients, and pollinators. (BLM 2007)

Treatment Using Fire

Live plant response to treatment with fire, particularly underburning, depends on many factors, including soil and duff moisture, plant vigor, phenological state (for example, dormant; flowering; releasing seed) at time of burning, and fire severity (Agee 1993; Smith and Fischer 1997). Response also depends on stand history. As organic material accumulates between fire events, seedlings and new rhizomes of some

species become established in the organic horizons, where they are more vulnerable to fire than plants established in mineral soil (especially if heavy fuels have accumulated) (Smith and Fischer 1997).

Mature ponderosa pine and western larch trees have several fire-resistant characteristics such as very thick, insulating bark, relatively deep roots, and open foliage which increase chances of surviving lower intensity fire (Smith and Fischer 1997); therefore, lower intensity fire may be lethal to only small-diameter saplings and seedlings. Either species may be vulnerable to fire if pitch has collected around old fire scars, or fires burning in deep surface fuels or deep duff affect the fine roots (Smith and Fischer 1997).

Douglas fir trees also develop fire-resistant bark as they mature, so only seedling, sapling and small-pole size trees may be vulnerable to lower intensity surface fire. However, the resistance offered by a thick layer of bark may be offset by shallow roots susceptible to fire damage, growth of closely spaced branches along the trunk, and pitch-streaked lower trunks (Agee 1993; Smith and Fischer 1997).

Mature western white pine trees have moderately thick bark, moderately flammable foliage, and self-pruning lower limbs, which provide this species with moderate fire resistance. White pine is more susceptible to fire when it grows in dense stands; is festooned with lichen growth; and due to its characteristically resinous bark. Young western white pine trees have thin bark, which does not provide fire resistance. (USDA Forest Service 2015)

In comparison, other tree species in northern Idaho such as subalpine fir, grand fir and western redcedar do not possess characteristics that protect them as well from fire and, therefore, are less resistant to its effects and are more likely to suffer mortality from burning. (USDA Forest Service 2015)

Lower intensity fire may not be lethal to many of the shrub and herbaceous species that occur in the action area. It is recognized that some plants or their means of reproducing themselves, such as seeds, may die as a result of fire treatments, but it is anticipated that site populations adapted to fire would survive, and some species' growth actually would be enhanced (USDA Forest Service 2009). Although aerial portions of fire-tolerant shrubs or herbs may be killed, the plants would survive by resprouting from roots, stems, rhizomes, or stored seed (Smith and Fischer 1997; USDA Forest Service 2009). Fire may also remove competing vegetation, facilitating regeneration by decreasing competition for light, water, nutrients, and pollinators.

As fire intensity increases, though, impacts to vegetation would be expected to become more severe. For example, areas of dense tree regeneration and heavy fuels resulting from disease-caused mortality would increase potential for higher intensity fire. (Smith and Fischer 1997). Also, fuels outside of root rot “pockets”, such as down logs, rotting stumps, or piled, thinned trees would produce more concentrated fire intensity that would kill or injure nearby live plants. Where fuels are piled and burned, the concentrated intensity of fire would kill plants directly under the piles, and kill or injure plants immediately adjacent to the piles. Over time, burn pile sites within project units would likely be recolonized by surviving seed and adjoining, surviving native vegetation, but additional replanting or seeding may be necessary to inhibit post-burn weed invasion. Soil beneath burn piles located at landings may be compacted, which could inhibit plant re-growth, though certain native pioneer species, as well as weeds, may be able to produce a sparse, post-burn vegetative cover.

Over time, sites in the project area treated with fire would likely be reseeded or recolonized by surviving native vegetation, although replanting or seeding may be necessary to inhibit post-burn weed invasion. Microsites in the native plant community that do not recover within one to two years following burning, perhaps due to more severe fire effects, would continue to be vulnerable to weed invasion or expansion.

Project features such as burn intensity, combined with site characteristics such as plant community response to fire, would contribute to a post-project mosaic of species, structures, and densities. For example, common native plant species that are less tolerant of burning or opening of the forest canopy may not be as well-represented in the post-treatment plant community, resulting in a change in the composition of site habitats over time. Establishment of new populations or persistence of existing weed infestations could also alter this mosaic. The post-project mosaic would change as ecological succession proceeds or a future vegetation disturbance occurs.

Treatment with fire perpetuates dominance by tree species that are resistant to both fire and root disease, especially the pine species and western larch. Conditions ideal for the spread of root disease tend to develop in forests where fire exclusion and selective logging have increased dominance by Douglas fir and the true firs. (Smith and Fischer 1997) Therefore, burning that approximates historic fire frequencies converts stand composition back to early successional stages and is an effective tool for managing root disease (Rippy et al. 2005). The amount of root disease in the project area would likely be reduced as a result of burning. Removal of understory vegetation, small-diameter in-growth, as well as shade tolerant trees by burning would reduce competition for water, nutrients, and sunlight, which would increase the vigor of the remaining trees.

Bark beetles prefer stressed trees to vigorous trees, especially in dense stands where the target tree species dominates (Smith and Fisher 1997). Injuries to trees caused by burning can also affect the tree’s ability to withstand attacks by insects and pathogens.

Stress to trees caused by fire-damaged roots, cambium or foliage can weaken the tree and predispose it to attack by bark beetles and root pathogens. (Demars and Roettgering 1982, Rippy et al. 2005, Hood et al. 2007). Trees weakened by fire can contribute to increased beetle populations; however, less damaged, surviving trees would have better defenses to withstand bark beetle attacks because reduced competition for water and nutrients increases overall tree health.

Treatments using fire can create areas of vegetation and ground disturbance which are vulnerable to weed invasion, especially where post-burn conditions allow more sunlight to reach the forest floor. (USDA Forest Service 2015) Therefore, weeds, which currently occupy sites in or adjacent to the project area and tend to do extremely well in warmer, drier environmental conditions, may spread or at least maintain their present level of infestation. However, inventory, treatment and monitoring of the project area would reduce potential impacts to native vegetation from weeds. Treatment of project-connected noxious weed infestations, especially, would assist re-establishment of native vegetation in disturbed areas by reducing competition for sunlight, water, nutrients, and pollinators. (BLM 2007)

Reforestation

Re-introduction and maintenance of ponderosa pine, western larch, and western white pine in the project area would aid re-establishment of diverse, resilient, and resistant forest vegetation. (Cooper et al. 1991, Smith and Fischer 1997, USDA Forest Service 2015) Managing for seral tree species would require subsequent actions to discourage re-growth of tree species (such as grand fir, western redcedar, and Douglas fir) that are well-adapted to project area growing conditions.

Road Construction/Renovation/Decommissioning

Plants growing along the proposed new permanent and temporary road segments would be injured or killed by clearing and construction. Equipment and vehicle use of the roads, plus periodic maintenance, would discourage vegetation from re-establishing, although a swath of lower stature plants would eventually re-grow adjacent to the road running surface. Use of a temporary road would reduce the longer term ecological and economic (maintenance costs) impacts associated with a permanent road.

Opening existing road segments that are blocked by brush or down logs, for example, would disturb plants that have established since the road corridor was last actively maintained. Road renovation of existing roads, plus blading and maintenance of roads during the life of the project, would disturb any vegetation that may have encroached onto the road surface since maintenance was last done. Use and maintenance of the existing roads would deter vegetation from re-colonizing and closing-off the corridors.

Construction, renovation, use, and maintenance of roads in order to implement the project would disturb plant communities and soils along the road corridors, increasing the threat of weed invasion and/or expansion. Weeds presently growing in the project area would have newly disturbed areas into which they could expand. Passenger vehicles and equipment, off-highway vehicles, wildlife movement, or wind currents could transport weed seed or fragments from existing infestations into native vegetation communities within the project area. Weeds may out-compete and displace desirable, native vegetation, altering plant community composition, structure, and function both in the present and future.

However, inventory, treatment and monitoring of project roads would reduce potential impacts to native vegetation from weeds. Treatment of project-connected noxious weed infestations, especially, would assist re-establishment of native vegetation in disturbed areas by reducing competition for sunlight, water, nutrients, and pollinators. In addition, road closures implemented at the end of the project would keep full-size and trail-size vehicles out of recently disturbed areas and help limit weed invasion and spread. Gates or barriers would need to be monitored periodically to reduce the possibility that they have been breached or bypassed, allowing vehicles to transport weeds into closed areas.

Idaho BLM Special Status Plant Species

The proposed action would not affect water howellia individuals, populations or potential habitat.

Most of the suitable habitat for Spalding's catchfly in the project area is not proposed for treatment. However, a small amount of it (less than 30 acres) is spread over several spots, including the ridgeline in the Section 17 harvest units; at certain points along the fuel break; and in the harvest and burn areas in Sections 21 and 28. Harvest units containing suitable habitat would be cable logged, which would reduce ground-level impacts, and reduce tree density, which would more closely resemble historical conditions. Establishing and maintaining a fuel break along the main ridgeline would also open-up areas of dense vegetation, re-creating conditions favoring Spalding's catchfly. Suitable habitat for Spalding's catchfly in the southernmost burn unit is quite degraded in some spots, with spaces between shrubs covered with a "carpet" of weedy species, instead of a grass-forb community in good to excellent ecological condition. Even a low intensity burn may promote a continuation of this weed-dominated herbaceous community. However, inventory, treatment and monitoring of weeds in the project area would reduce potential impacts to suitable habitat for Spalding's catchfly by decreasing competition for sunlight, water, nutrients, and pollinators.

The proposed action would not affect whitebark pine individuals, populations or potential habitat.

The proposed action would not affect bank monkeyflower, clustered lady's-slipper, Constance's bittercress or deerfern individuals or populations, though potential habitat for each of these species would be disturbed by harvest, thinning, or burning treatments. Effects to potential habitat would vary according to individual species' ecological requirements. For example, bank monkeyflower thrives in open canopy, bare mineral soil environments and would likely benefit from a project that "opens up" a forest stand. In contrast, a species such as deerfern which grows in shady habitats may be more sensitive to canopy removal.

Data describing pine broomrape's response to disturbance are scarce. Rare species monitoring by the U.S. Forest Service during the first year after a wildfire in north-central Washington included pine broomrape; however, preliminary results concerning this species' response to disturbance were inconclusive, and the study was not funded in subsequent years. (Harrod et al. 1997, Harrod pers.comm. 2009) Its host plant, oceanspray, is described in the Fire Effects Information System database (USDA Forest Service 2015) as being favored by disturbance. The database states that oceanspray prefers open sites; is a "light- demanding, early successional" species; and is promoted by disturbances that open the canopy. Based upon the regenerative abilities of oceanspray, it is possible that the obligate root parasite pine broomrape also exhibits some resiliency similar to that of its host. Because of the uncertainty surrounding this species, close coordination would occur between the Field Office botanist, Project Lead, and District fuels staff during project implementation, so that effects to the broomrape plants would be minimized. In addition, post-project monitoring of the populations is planned.

Regarding the possibility that weeds would invade or expand into habitat for each of the special status plant species discussed in the preceding two paragraphs, unfortunately, while timber harvest or prescribed fire can be used as a management tool to restore historic fire regimes and promote desirable tree species, the disturbance created by these activities can favor invasive species. (USDA Forest Service 2009, 2015) Weeds are highly competitive and can often out-compete native vegetation, especially on recently disturbed sites. (BLM 2007) However, proposed post-project monitoring and weed treatment would reduce deleterious effects of weedy species on potential habitat for bank monkeyflower, clustered lady's-slipper, Constance's bittercress, deerfern, and pine broomrape.

In conclusion, each of these species has slightly different habitat requirements and responses to disturbances, which makes management of their diverse habitat needs challenging. However, project design features would decrease harvest, thinning, and fuels treatment impacts, ensuring that the BLM does not contribute to the need to list bank monkeyflower, clustered lady's-slipper, Constance's bittercress, deerfern, or pine broomrape as threatened or endangered.

7.3.3 Environmental Effects from Alternative B (No Action):

Vegetation Communities and Idaho BLM Special Status Plant Species

Plant succession would continue toward the potential natural community, where possible, in the absence of disturbance. Over time, sites in the area capable of supporting more dense forest vegetation would become dominated by shade-tolerant species, until a future disturbance such as logging, wildfire, insect infestation, disease, or weather event creates openings in the forest community. Undesirable numbers of Douglas fir and grand fir trees vulnerable to insect and disease outbreaks would continue to compete with ponderosa pine, western larch, and western white pine. Insect and disease outbreaks would continue within the project area. Weeds would still remain in and adjacent to the project area and compete with desirable native species.

This alternative would have no effect on water howellia, or whitebark pine, or their habitat. Although no management actions would occur in suitable habitat for Spalding's catchfly, ecological succession would continue to proceed, resulting in more tree invasion and less favorable environmental conditions for both the catchfly and bank monkeyflower. However, as succession proceeds, habitat for shade tolerant rare species such as clustered lady's-slipper, Constance's bittercress, or deer fern would persist and possibly expand into more acreage. No harvest or burn treatment would occur near the pine broomrape plants; however, as succession proceeds, a reduction would occur in the early successional habitat favored by its host plant, oceanspray, which could, in turn, affect the broomrape plants.

Impacts to common, native plant communities and rare plants from a wildfire may be more severe due to the amount of fuels accumulated in unthinned areas, and possibly spread beyond the boundaries of the proposed action. A wildfire has the potential to be stand-replacing but may also create a mosaic of burned and unburned vegetation, depending upon factors such as variation in fire behavior. A wildfire in the project area could affect a greater number of acres than the proposed action, putting more acres at risk from weed invasion.

7.3.4 Cumulative Effects:

The analysis area for vegetation communities and Idaho BLM Special Status Plant Species is defined as the Pine Creek drainage, which is approximately 50,560 acres (79 square miles).

Alternative A, Proposed Action

As summarized in Section 7.1.2, past land use practices and disturbances in the analysis area have influenced the species composition, vertical structure, and density of existing plant communities, including rare plants. Invasive and/or introduced species

have established in the analysis area. Currently, various stages of ecological succession are present due to past disturbances.

Present human-caused and natural disturbances in the analysis area which affect vegetation include small-scale mining; timber harvest; road building, use and maintenance; trail use and maintenance; firewood cutting; recreational activities; fire; wind blow-down events; and insect and disease outbreaks.

Reasonably foreseeable future actions and natural disturbances in the analysis area include road building, use and maintenance; trail use and maintenance; firewood cutting; recreational activities; fire activity; flooding; wind blow-down events; and insect and disease outbreaks. The fuel break proposed for the Pine Point ridgeline would also need to be thinned periodically to retain its fire-break characteristics.

Ongoing and future vegetation-disturbing activities in the analysis area would continue to promote a mosaic of plant communities in various stages of ecological succession. The variety of successional stages would provide the diverse habitats needed to support rare species such as bank monkeyflower, and pine broomrape, though habitat condition would be degraded by the presence of weedy species. Ecological succession would proceed where vegetation is left undisturbed and would influence vegetation species composition, vertical structure, and density. Plant communities that revert to earlier ecological succession stages due to disturbance such as timber harvest, insect infestation, or disease would begin the process of maturing all over again and include habitat characteristics favorable for rare species like bank monkeyflower and pine broomrape. Ongoing and proposed activities that impact vegetation would open up sites favorable to weed invasion due to ground disturbance and/or reduction of tree canopy cover. Where left untreated, though, weeds would continue to threaten native plant communities, including Idaho BLM Special Status Plant Species.

The proposed action would treat approximately 746 acres of about 50,560 acres of vegetation in the analysis area; therefore, this project is unlikely to contribute cumulative effects to common, native plant communities, bank monkeyflower, clustered lady's-slipper, Constance's bittercress, deerfern, or pine broomrape; due to the relatively small area of disturbance and its staggered timing of implementation, when compared to the overall analysis area.

<u>No Action Alternative</u>

Under this Alternative, zero acres of vegetation in the Lynch Gulch project area would be disturbed by vegetation treatment. Vegetation composition and structure on adjacent lands in the analysis area could be altered by a future wildfire. The number of acres burned and severity of fire effects would be dependent upon many variables, including

whether or not any treatments have been implemented to lessen the severity of those fire effects. Fires on these lands could also spread to untreated vegetation in the project area. Where left untreated, weeds would continue to threaten native plant communities, including rare plant populations.

7.4 Fuels

7.4.1 Affected Environment:

Fire Behavior Fuel Models

Scott and Burgan (2005) categorized 40 standard fuel models based on a variety of fuel loadings and distribution that lead to predicted fire behavior outcomes. Fire behavior, such as flame length, surface fire spread, or fire intensity, is dependent on such characteristics as fuel type (e.g. grass, grass-brush, brush, timber litter, timber understory, slash) and fuel loading (size, amount, and distribution). Heavier fuels loadings, such as concentrations of logs or small trees and shrubs, contribute to more intense fire behavior and higher flame lengths. Ladder fuels, in the form of tall brush and young trees in the understory as well as low branches on less fire-resistant species, provide an avenue for surface fire to move upward into the forest canopy thus involving crown fuels.

Fire behavior not only effects the vegetation, but also the ability of firefighting resources to effectively manage or suppress the fire. Flame length of 4 feet is considered the threshold for firefighters on the ground to effectively and safely fight fire. Flame lengths above 4 feet require mechanized or aerial firefighting resources. Flame lengths above 8 feet are considered difficult for any firefighting resources to be effective.

Fuel conditions in the project area have been classified into 6 of the 40 fire behavior fuel models (LANDFIRE 2012; See Map 6). Approximately 53 percent of the project area is classified into timber fuel models TL8, TU1, and TU5 (See Table 7.4.1), while 47 percent of the project area is currently in a grass or grass/shrub fuel model (GR2, GS2, of SH7).

Three of these fuel models (GR2, TU1, and TL8) exhibit predominantly surface fire behavior under wildfire conditions, with limited opportunity for fire to get up into the crowns. Fuel model TU5, however, has a high surface fuel loading, in addition to a ladder fuel component that allows fire to move up into and become established in the crowns. Grass-shrub fuel model GS2 and shrub fuel model SH7 would also exhibit high flame lengths due to the shrub (or seedling/sapling) component.

Fire behavior was determined for each fuel model using the BEHAVE Plus fire modeling system, under typical fire season weather conditions. Currently, 72 percent of the project area is subject to wildfire flame lengths of 8 feet or greater, where firefighting efforts would be greatly hindered.

Table 7.4.1. Current expected fire flame length* and probability of fire-caused mortality** under typical wildfire scenario.

Fuel Model	Fuel Type	% of area	Flame Length (Ft)	Larch	Ponderosa	Douglas-fir
GR2	Grass	10%	7.6	30%	22%	53%
GS2	Grass/shrub	34%	8.9	53%	80%	98%
SH7	Shrub	3%	24.0	53%	80%	98%
TL8	Timber	14%	2.9	0%	0%	0%
TU1	Timber	4%	4.6	0%	0%	0%
TU5	Timber	35%	11.4	53%	80%	98%

*BEHAVE Plus model input includes fuel moistures: 4% 1-hr, 5%10-hr, 6% 100-hr, 30% live herbaceous, 50% live woody; 20ft wind speed 30 mph, 55% slope

**71 ft. canopy height, 0.55 crown ratio, 12" dbh, 90 degrees F.

Fire Severity – tree mortality

Tree mortality is used as a measure of fire severity, or stand resiliency, as it represents the ability of a stand to withstand, or succumb to a wildfire. Fire-caused mortality is based on the expected fire behavior, as well as tree species and size class. Direct fire damage including percent crown volume scorched (Stephens and Finney 2002) and bark char have been shown to be key factors in predicting post fire tree mortality (van Mantgem and Schwartz 2003).

Open ponderosa pine stands on south-southwest facing slopes as well as open dry, mixed conifer stands of ponderosa pine, Douglas-fir, and western larch are typically resistant to the detrimental effects of fire. Occasional trees may succumb to fire, but the stands would remain largely intact. These open stand conditions were historically maintained by low to mixed severity fire, which reduced the surface fuel accumulations, reduced ladder fuels, and prevented the encroachment of less fire resistant species.

Species characteristics, such as bark thickness, root depth, and canopy base height make species such as western larch, ponderosa pine and Douglas-fir trees fire resistant. Western larch is most resistant to crown scorch due to the annual replacement of all needles. Douglas-fir is less fire-resistant due to its lower branching habit and shade tolerance, which allows this species to grow in denser stand conditions.

Fire-caused tree mortality was determined for each fuel model using the BEHAVE Plus fire modeling system, under typical fire season weather conditions (See Table 7.4.1). Current conditions leading to high fire-caused mortality include smaller average diameter, lower tree height, and high crown ratio (lower limbs). Areas characterized by fuel models with a heavy shrub or small tree component (GS2 and SH7) or high concentrations of dead and down (TU5) would experience high fire-caused mortality. Currently, 72% of the project area is at risk of high mortality (greater than 50%) in the desired ponderosa pine or western larch trees.

7.4.2 Environmental Effects from Alternative A (Proposed Action):

Fire Behavior Fuel Models

Commercial harvest treatments in this alternative would open up canopy fuels, while burning slash piles and prescribed burning would reduce surface fuel loading and reduce the ladder fuel component. Fuels reductions would be significant enough to alter certain fuel models. Fuel reduction treatments on 477 acres of timber fuel model TU5 would effectively change classification to fuel model TL1. Fuel reduction on 143 acres of timber fuel model TL8 would temporarily reduce the amount of litter, but would remain classified as TL8 due to the annual accumulation of pile needles.

Removal of the small trees and brush would reduce the shrub component in fuel model GS2 sufficiently to alter these areas to grass fuel model GR2, while fuel model SH7 would change to GS2 (See Table 7.4.2). Wildfire flame lengths would be less than 8 feet across 66% of the treatment area and strategic location of the fuel break along the ridgetop would allow fire resources to more effectively control the fire.

Table 7.4.2. Post treatment expected flame length* and probability of fire-caused mortality** for desired tree species.

Fuel Model	Fuel Type	% of area	Flame Length	Larch	Ponderosa	Douglas-fir
GR2	Grass	23%	6.9	3%	6%	13%
GS2	Grass/shrub	23%	8.6	39%	57%	90%
SH7	Shrub	1%	20.9	47%	80%	98%
TL8	Timber	14%	3.1	0%	0%	0%
TU1	Timber	29%	4.7	0%	0%	0%
TU5	Timber	10%	11.4	47%	80%	98%

*BEHAVE Plus model input includes fuel moistures: 4% 1-hr, 5%10-hr, 6% 100-hr, 30% live herbaceous, 50% live woody; 20ft wind speed 30 mph, 55% slope

*93ft. canopy height, 0.4 crown ratio, 14” dbh, 90 degrees F.

Opening up these stands would lead to an increase in solar radiation to surface fuels and an increase in surface winds. Fuel moistures would dry out quicker making these fuels more available to burn, while increased surface winds could cause fires to spread quicker. Raymond and Peterson (2005) found that increased fire behavior in these more open stand conditions would result in lower severity due to lower fuel accumulations and less likelihood of crown fire initiation and mortality. Additionally, Graham et al. (2004) found that increased solar radiation along with increased soil nutrient availability from prescribed burning would promote understory vegetation production in the form of forbs, grasses, and low shrubs. While these live fuels are still green, their higher foliar moisture would have a dampening effect on fire behavior (Agee et al. 2000), but once cured out would contribute to fire behavior.

Fire Severity – tree mortality

The three key drivers of fire behavior and severity are weather, topography, and fuels. Although weather may play a more important role in driving fire behavior, we have the greatest opportunity to influence fuel characteristics through changes in composition and structure. Fire behavior and size that is driven by extreme weather events may be less important than the severity of those fires with fuel treatments. Treatments should be designed to save those ecosystem elements that have survived historical fires such as the large diameter, fire-resistant ponderosa pine and Douglas-fir trees (Reinhardt, et. Al 2008, Agee and Skinner 2005).

High probability of fire-caused mortality would be a threat across 34% of the project area after treatment. The remaining 66% of the project area would see little or no tree mortality as a direct result of fire behavior. This does not account for post fire stress and secondary mortality from insects and pathogens, which can be expected to increase post fire mortality. Commercial thinning would result in release of the overstory trees, increasing tree height and diameter. Understory burning on the south-facing stands would additionally raise the canopy base height by killing the lower limbs of these trees.

7.4.3 Environmental Effects from Alternative B (No Action):

Fire Behavior Fuel Models

Under this alternative, both surface litter and ladder fuels would continue to accumulate. As overstory tree species continue to convert from the fire resistant ponderosa pine and western larch toward less fire resistant fir species, increased crown closure and ladder fuels would increase the likelihood of crown fire initiation. Studies have shown that the no treatment option is ineffective in reducing fire severity (Stephens and Moghaddas 2005).

Grass and brush litter would continue to build up in the non-timbered areas. Timbered stands would continue to move toward TU5 fuel conditions. Resulting fire behavior would increase as would opportunities for fire to move upward into the crowns. Wildfires would have greater opportunities to escape control efforts and burn larger areas, extending onto private land and toward houses.

Fire Severity – tree mortality

Higher tree mortality would result from more severe wildfires, and surviving trees would be predisposed to insects and disease mortality (Barrett 1994). As overstory tree species continue to convert from the fire resistant ponderosa pine toward less fire resistant fir and spruce species, mortality would increase as these thin-barked, dense crowned, shallow rooted species are less able to withstand even low severity fires.

Wildfire activity in the project area would be difficult to suppress, thus posing a great risk to private property in the Pinehurst area. Fire activity and smoke could impact traffic safety along the roadways and in Pinehurst and may require short– or long–term closures of the primary access into the West Fork of Pine Creek developed area. Power and phone lines that feed these developments may also be disrupted.

7.4.4 Cumulative Effects:

This proposed action along with timber harvest and other fuel reduction treatments on adjacent private property would cumulatively reduce the intensity and severity of wildfires burning through the area. These treatments tie in with other projects on adjacent lands and the proposed action may enhance fire suppression efforts and decrease the overall wildfire severity. Any future development near the project area would benefit from reduced fire risk under the action alternatives because of the added fire protection these alternatives offer. This project, in conjunction with other fuels reduction treatments, would contribute to the improvement of Fire Regime Condition Class (FRCC) across the landscape.

Although the effects of global climate change are not known at the local scale, it can be inferred that conditions will trend toward warmer, drier conditions. This trend would slow down decomposition rates of biomass, leading to increased buildup of surface fuels. Climate change may also extend the length of fire season, leading to increased fire activity. It can be assumed, therefore, that fuels reduction treatments, particularly within the wildland-urban interface will become even more critical in the future.

The No Action alternative would have no immediate effect on fuel conditions in the project area. However, fuel loadings would accumulate, increased stand density and ladder fuels would continue to increase, and less fire resistant species would eventually dominate most stands. The result is that more of the landscape could sustain fires with greater crown fire potential, and increased tree mortality. Over time, fire suppression options would become even more limited, increasing the risk of property and resource damage, and firefighter and public injury.

7.5 Cultural Resources

7.5.1 Affected Environment:

An on-the-ground cultural resource inventory was conducted. Within the proposed project area of potential effect two cultural resources were located. Both are related to historic mining and primarily consist of collapsing adits. Several other cultural resources, also related to past mining, are located in the analysis area in designated retention areas.

7.5.2 Environmental Effects from Alternative A (Proposed Action):

Two cultural resource sites are located in a riparian reserve area within a harvest area. Several other cultural resources are located in designated retention zones. However, no ground disturbing activities are planned within the riparian reserve or the other retention areas. Therefore, there are no anticipated impacts to cultural resources.

7.5.3 Environmental Effects from Alternative B(No Action):

Cultural resources within the analysis area will continue to be affected by natural deterioration. The no action alternative will not have any impact to cultural resources.

7.5.4 Cumulative Effects:

Since there are no impacts to cultural resources from the alternatives there are no cumulative effects.

7.6 Aquatic/Special Status Species:

7.6.1 Affected Environment:

The proposed project area is located within the Pine Creek watershed, a tributary to the South Fork of the Coeur d'Alene River. The area proposed for treatment is located mainly on ridgetop between Little Pine Creek and East Fork of Pine Creek.

Fish surveys within the Pine Creek watershed, most recently in 2010, have documented the presence of westslope cutthroat trout, *Oncorhynchus clarki lewisi*, brook trout, *Salvelinus fontinalis* and sculpin (Fredricks and Hardy, 2010; Dupont and Horner, 2006). The sculpin collected in the 2010 survey were identified as shorthead sculpin, however new research suggests it is more likely they are torrent sculpin, *Cottus rhotheus* and/or the newly described cedar sculpin, *C. schitsuumsh* (Lemoine, et al. 2014). The shorthead sculpin has been historically confused with the cedar sculpin. Westslope cutthroat trout and cedar sculpin are BLM sensitive species. Brook trout are an introduced species. Streams within portions of the project area proposed for treatment include Nabob Creek, Lynch Gulch, and several unnamed tributaries, which are tributaries to East Fork Pine Creek, as well as Deer Lick Gulch, McKinney Gulch and an unnamed tributary which are all tributaries to Little Pine Creek. None of the streams within the project area are known to contain fish. East Fork Pine Creek and Little Pine Creek both contain fish including westslope cutthroat trout and sculpin.

Historically, bull trout, *Salvelinus confluentus*, federally listed as a threatened species, inhabited the South Fork Coeur d'Alene River watershed but are no longer found in the area. There is no designated critical habitat for bull trout within the South Fork watershed. No additional discussion of bull trout will occur in this analysis.

The aquatic habitat and water quality within the Pine Creek watershed has been heavily impacted by mining. Past flooding, timber harvest, development and road building has also impacted the watershed. Restoration efforts and more restrictive land management practices and regulations are resulting in some improvement in aquatic conditions. However, elevated levels of heavy metals, particularly zinc, and lack of habitat complexity continue to keep fish numbers low, especially in the mainstem and East Fork of Pine Creek.

7.6.2 Environmental Effects from Alternative A (Proposed Action):

The primary impacts from timber and fuels management activities and associated roads on fish and aquatic habitat come from the potential for an increase in sediment and temperature in streams, and a decrease in the amount of large downed wood in the stream channel and adjacent riparian floodplain (Chamberlain et al. 1991; Everest et al. 1985; Meredith et al. 2014). These impacts can affect not only adjacent streams within the project area, but downstream habitat as well. Elevated water temperature and increase in sediment and turbidity can cause physiological stress in fish, reducing overall health and survival. Excess sediment also reduces spawning and pool habitat, and may decrease food supply by altering the aquatic macroinvertebrate composition (Chamberlain et al. 1991; Everest et al.1985).

Increase in stream temperature is likely to occur if trees that provide shade to the stream channel are removed. Roads can cause an increase in sediment input to streams (Furniss et al. 1991), as can soil disturbance caused by yarding and skidding of logs (Chamberlain et al. 1991). Sediment input to streams can also be caused by removal of trees adjacent to the stream channel, as this can cause bank instability and reduces the ability of the riparian area to stop sediment before it enters the stream (Chamberlain et al. 1991; Everest et al. 1985). Large wood is often recruited to the stream channel from the adjacent riparian and upslope areas, thus removing adjacent trees would reduce future inputs of large wood (Murphy and Koski 1989; May and Gresswell 2003). Mechanical fuels treatments would have similar impacts to those caused by timber harvest activities.

Wildfire and prescribed fire can also impact fish and aquatic habitat. Fires can increase erosion and sediment input to streams, alter water chemistry, and cause increases in water temperature (Benda et al. 2003; Rieman et al. 2003; Wondzell and King 2003). Effects can also be beneficial, such as increase in large wood input to the stream channel (Bisson et al. 2003), and even a pulsed sediment input to a stream may help increase aquatic habitat complexity (Benda et al. 2003). The extent of impacts from fires can vary greatly depending on fire patchiness and intensity, the preexisting conditions of the watershed and riparian communities, potential for recolonization of fish and other aquatic fauna, and the nature of fire suppression and post fire management (Rieman et al. 2003; Dunham et al. 2003; Gresswell 1999). A large or stand replacing wildfire could result in severe long-term impacts to fish and aquatic habitat.

Riparian Conservation Areas (RCAs) are lands that are likely to affect the condition and/or function of aquatic habitat, and are usually adjacent to streams, ponds, lakes and wetlands. In RCAs, riparian-dependent resources receive primary emphasis, and management activities are subject to specific guidelines. In the proposed action, no timber harvest is proposed to occur within RCAs. A small amount of prescribed burning may occur where fire is allowed to back down into the RCAs, however no ignition would occur within any RCAs. The small amount of burning and the relatively low intensity of

a prescribed burn would limit the potential for negative impacts, and may be beneficial. About 5.7 miles of road renovation and 2.4 miles of new road construction would occur. All new road construction would be located outside of RCAs. After completion of the project, about 2.9 miles of road would be decommissioned, for a net decrease of 0.5 miles of road. Though there is potential for sediment movement due to the road work, the renovation may improve road condition, which along with the overall decrease in road miles would improve watershed conditions. No impact to fish, including westslope cutthroat trout and cedar sculpin, or aquatic habitat is anticipated from implementing the proposed action (sediment entering streams, or loss of future large wood inputs to stream channels). In addition, implementing the proposed forest health and fuels treatment should reduce the possibility of a large or stand replacing wildfire in the area, which would benefit fisheries resources.

7.6.3 Environmental Effects from Alternative B (No Action):

No timber harvest or fuels treatments would occur therefore aquatic habitat conditions would remain in their current condition. Under this alternative there is a greater possibility of a large or stand replacing fire occurring, which could have harmful effects to the East Fork Pine Creek and Little Pine Creek watersheds and affect both fish and aquatic habitat (impacts of fire are discussed above under the proposed action). If extreme impacts occurred to the watershed either due to immediate direct effects of the fire (such as temperatures reaching lethal levels for fish), or indirect effects (erosion and high levels of sediment moving into the stream), it is possible that fish populations in the the East Fork Pine Creek and Little Pine Creek watersheds, including westslope cutthroat trout and cedar sculpin, would be reduced.

If the action alternative is not implemented, potential adverse impacts would be avoided; however no long-term impacts that would alter the viability of fish species or quality of aquatic habitat in the the East Fork Pine Creek and Little Pine Creek watersheds were anticipated. The possibility of a large stand replacing fire occurring is slightly increased under this alternative, which could affect both fish and aquatic habitat within the the East Fork Pine Creek and Little Pine Creek watersheds, with the possibility of at least some of the fish being eliminated. The fish species found within the East Fork Pine Creek and Little Pine Creek watersheds, including westslope cutthroat trout and cedar sculpin, are also found in the rest of the Pine Creek watershed, and the South Fork Coeur d'Alene River and its many tributaries. Westslope cutthroat trout are found throughout much of northern and central Idaho and western Montana and cedar sculpin are found throughout the Coeur d'Alene River watershed. Reduction or elimination of the East Fork Pine Creek and Little Pine Creek watersheds native fish populations would not impact these species throughout their range.

7.6.4 Cumulative Effects:

The analysis area is the Pine Creek watershed. Westslope cutthroat trout stocks throughout the Coeur d'Alene Basin exist at a fraction of historic levels due to habitat

degradation from activities such as mining, logging, development, and road construction. These activities have all occurred in the smaller watershed of Pine Creek, with mining in particular heavily impacting all fish species. Fishing pressure and introduction of non-native fish species have also contributed to reducing cutthroat numbers (DuPont and Horner 2003). All these activities are expected to continue in the present and into the future. Mining, which probably has had the greatest impact on westslope cutthroat trout, cedar sculpin and other native fish species, will likely have less of an impact in the future due to stronger regulations and ongoing restoration work occurring in the watershed. Fishing pressure on westslope cutthroat trout has been reduced due to catch and release regulations set by the Idaho Department of Fish and Game, so effects from fishing also should decrease in the future. The proposed action could incrementally add to these benefits by reducing the possibility of a large or stand replacing wildfire.

7.7 Invasive, Nonnative Species (Weeds):

7.7.1 Affected Environment:

Invasive weeds threaten our public lands by outcompeting native vegetation and adversely affecting native plant and animal communities, damaging watersheds, and increasing soil erosion. Plant communities in the proposed action area have been affected by prior disturbances such as fire, timber harvesting, road building, mining activities, recreation activities, wildlife, and firewood cutting.

Many weed species have invaded the proposed project area. Roads and trails throughout the project area have populations of spotted knapweed (*Centaurea maculosa*), meadow hawkweed (*Hieracium pratense*), St. Johnswort (*Hypericum perforatum*), oxeye daisy (*Chyrysanthemum leucanthemum*), Dalmatian toadflax (*Linaria genistifolia*), Sulfur cinquefoil (*Potentilla recta*), Canada thistle (Cirsium arvense), and bull thistle (Cirsium vulgare). Localized populations of common tansy (*Tanacetum vulgare*) have been identified on the road accessing the project area.

The highest densities of weeds in the project area are located on the open south and west facing slopes below and adjacent to Pine Point. These weed populations also extend to the adjacent dry conifer habitat types. In addition, the brush field located in the southern end of the project area on the lower slopes also contains a significant weed population and extends into the adjacent forested area particularly along roads and game trails. These dry sites provide ideal habitat for invasive weeds to outcompete native vegetation.

While the BLM has conducted herbicide treatments of weed populations on roads and trails and successfully reduced these weed populations, some weeds have persisted and spread into forested areas. Biological control insects (bio-controls) have been released that have established in the project area. Bio-controls for spotted knapweed that have established include *Cyphocleonas achates*, *Larinus minutus*, and *Urophora* sp. *Mecinus janthinus,* a stem boring weevil that feeds on Dalmatian toadflax was released in 2007 near Pine Point and has significantly reduced toadflax populations in the project area.

A major component of this weed spread results from weed populations on adjacent private lands. Private lands adjacent to the BLM land in the project area have experienced prior logging activities. Many of these areas are infested with populations of the weeds listed above and provide a continuing source of weed seed.

7.7.2 Environmental Effects from Alternative A (Proposed Action):

Road construction, road renovation, landing construction and skid trails would disturb existing vegetation and soils. Weed seeds and plant parts may be transported along these disturbed areas by vehicles during construction, maintenance activities, and logging operations. Sources of weeds may be from the existing project area weed populations. Weeds may also be transported into the project area from offsite weed populations, potentially introducing weeds species that are new to the project area. . The environmental design features described in 6.1.2, include washing of all equipment that will leave the established roadways and landing areas. This will reduce the possibility of introducing new weeds into the project area.

Activities including tractor skidding, skyline yarding, broadcast burning, road construction and renovation would increase the risk of weed expansion into forest areas. These activities would remove existing vegetation, disturb soils, increase light to the forest floor, all factors that favor weeds. These same activities can potentially provide transport of weed seeds and plant parts into these disturbed areas. Weed species are often better adapted to colonizing newly disturbed areas than native species.

7.7.3 Environmental Effects from Alternative B (No Action):

No action would result in current population of weeds continuing to expand along roads and OHV trails. Herbicide treatments would slow or prevent the expansion in accessible areas while bio-controls would limit spread of target weeds. In dry conifer forests weeds can expand from existing populations into forested areas often spread by wildlife. In wet, warm conifer areas, assuming little to no disturbance, expansion of weed populations into forested areas is unlikely due to low light levels reaching the forest floor.

No action in the project area would result in increased fuel loading and with it increased risk of severe fire. A severe fire would remove competing vegetation and subsequent soil exposure leaves a burned area primed for noxious weed invasion. Existing population of weeds in the project area, as well as private lands adjacent to the project area that are heavily infested with weeds, would provide a weed seed source and increase the likelihood of weed establishment following a severe fire. The increased fuel loading and existing weed populations combine to create a potential for significant increase in weed infestation of burned areas following a fire event.

7.7.4 Cumulative Effects:

There are many factors in the analysis area that contribute to the spread of noxious weeds including: logging, transportation, wildlife, wildland fires, recreation and other uses.

Noxious weed control efforts in the project area and within the watershed would be conducted as part of the Coeur d'Alene Field Office Weed Management program. Weed control priorities and methods are described in the Coeur d'Alene Resource Management Plan (RMP) (BLM 2007) and the Coeur d'Alene Field Office Programmatic Environmental Analysis for Vegetation Treatments (BLM 2008).

The Coeur d'Alene Field Office weed program is part of the Inland Empire Cooperative Weed Management Area (IECWMA). These cooperators have noxious weed control responsibilities and interests on adjacent and co-mingled lands in the area. Uncontrolled weed populations in one jurisdiction greatly affect the ability of other land managers to control weeds on lands they administer. The IECWMA promotes an integrated weed management program throughout the area that includes public relations, education and training in the noxious weed arena, along with coordination of weed control efforts and methods, and sharing of resources.

Past events such as road-building and use; logging; mining; fire; and OHV activity have contributed to weed invasion on BLM and non-BLM lands. Where left untreated, these weeds may have persisted and continue to threaten native plant communities; although in areas where plant canopy has provided sufficiently shaded conditions, weeds may have not established or decreased in extent over time. Where effective treatment has occurred, weeds have been either eradicated or their spread into native vegetation has been curtailed. Ongoing and reasonably foreseeable actions on non-BLM land which would increase the threat of weed invasion into native plant communities include road-building and use; logging; fire; wildlife, and OHV activity.

The short term effects of the proposed action may result in increased weed establishment and spread in areas of ground disturbance. Over the long term, the reduction in threat of wildfire in the analysis area along with weed control activities undertaken by BLM on public lands would contribute positive cumulative effects on noxious weeds through participation in the IECWMA and implementation of the proposed action.

7.8 Wildlife/Habitat and Special Status Wildlife/Migratory Birds:

7.8.1 Affected Environment:

General:

Because of the diverse forest stand structure in the project area, an equally diverse array of wildlife species can be found on the site (see Forest Vegetation Section 7.2 and Table 7.8.7). North and east-facing slopes generally have more dense forest stands which provide thermal and hiding cover for big game species such as elk and white-tailed deer. These stands are also suitable for other wildlife species that prefer more closed canopy forests such as Pacific Wren, Northern Goshawk (nesting habitat), Hammond's flycatcher, Western Flycatcher, and Fisher. South and west facing slopes are generally drier and warmer and have a more open forest structure with dominant tree species being ponderosa pine, Douglas fir, lodgepole pine, larch, and grand fir in the understory. These types of stands provide habitat for species like Dusky

Flycatchers, Western Tanager, Calliope Hummingbird, and Pygmy Nuthatch. These sites also provide forage for big game species throughout the year, depending on the elevation of the site.

Because forest insects and disease are already present on the site, there are snags available to wildlife that require cavities. There are bats, birds, and other mammal species such as flying squirrels that use snags for a portion of their life-cycle present on the site. Larger diameter trees can also be found throughout the project area. These will become valuable future snags. Moist areas resulting from springs, as well as riparian areas associated with perennial and intermittent streams provide valuable habitat for salamanders, bats, and numerous other wildlife species.

Access is not controlled by gates or any other physical obstacle, such as Kelly humps. As a result ATV and full size vehicle use is common in the area, particularly on the west side of the ridge. The proximity to the community of Pinehurst results in moderate recreation impacts. The highest use occurs during the hunting season for elk and deer and in the summer months when recreational vehicle use is high. Forests on adjacent private lands have been harvested and there are numerous roads and skid trails within the project area. All of these roads can serve as vectors for the spread of weeds, and increase motorized vehicle access which has known negative impacts to many wildlife species (Mace et.al 1996, McLellen and Shackleton 1988, Van Dyke et. al 1986, and Rost and Bailey 1976)).

Table 7.8.7a summarizes the Special Status Species that may be found in the project area.

Species	Likely to Inhabit	Uncommon-May Inhabit	Encountered on Site Visit
Bald Eagle[B]		X	
Northern Goshawk[B]*		X	
Flammulated owl[B]		X	
Lewis' woodpecker*[B]		X	
White-headed woodpecker[B]		X	
Common nighthawk*		X	
Olive-sided flycatcher*[B]		X	
Cassin's finch[B]		X	
Wolverine*[B]		X	
Fisher*[B]		X	
Silver-haired bat*		X	

Species	Likely to Inhabit	Uncommon-May Inhabit	Encountered on Site Visit
Townsend's big-eared bat*[B]		X	
Long-eared myotis*[B]	X		
Long-legged myotis*[B]		X	
Hoary bat*			
Western small-footed myotis*[B]		X	
Coeur d' Alene Salamander[B]		X	
Idaho giant salamander[B]		X	
Northern leopard frog*		X	
Western toad*	X		

** Threatened, Endangered, Proposed, or Candidate Species, * IDFG species of Greatest Conservation Need, [B] Bureau of Land Management Type 2 Special Status Species

Threatened and Endangered Species

There are currently three federally protected wildlife species that occur in north Idaho. Grizzly bear (Ursus arctos), woodland caribou (Rangifer tarandus) and Canada lynx (Lynx canadensis). All except the caribou are listed as Threatened under the Endangered Species Act. The woodland caribou is an Endangered species. No listed species have been documented in the project area.

Woodland caribou require high elevation old growth forest and a sufficiently developed lichen community for winter survival (Servheen and Lyon 1989). The project area is not suitable habitat for caribou and does not hold potential for becoming suitable habitat for this species because of the elevation and the potential vegetation community.

Canada lynx are highly associated with both late and early succession forest stands. Early successional, densely stocked stands provide foraging habitat, while mature forest stands act as potential denning habitat (IDFG 2005, Ruggerio 1994). Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist

Douglas-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat. (Interagency Lynx Biology Team 2013). One lynx was reported within 6 miles of the project area documented in the Conservation Database. This sighting was submitted to IDFG in 1978, but the person was considered to be of "uncertain background" and with "unknown ability" to distinguish between similar taxa. This area is not within a Lynx Analysis Unit or considered to be Lynx Habitat.

The project area lies between the Cabinet Yaak Recovery Zone and the Bitterroot Ecosystem which have been outlined as areas important to the recovery of grizzlies throughout their historic range (USFWSa 2012). Currently this area is considered to be "unoccupied" by grizzlies (USFWSb). However, one young male was killed inadvertently near Rose Lake in 2010, 13 miles from the project area. Also an adult male was killed in Kelly Creek in the Clearwater Drainage in 2007, 70 miles from the project area. In 2014 a female grizzly bear traveled to Grassy Mountain, which is southwest of the project area by 20 miles and stayed in Idaho for several days before returning to Montana. A grizzly bear that was documented on the North Fork of the Coeur d'Alene River near Enaville in the fall of 2015 was later killed by a hunter that same year. Otherwise, no grizzlies have been verified in this area in 60 years.

Grizzly bears are flexible in their habitat requirements. Their main habitat requirement is sufficient prey, forage, thermal cover, and denning habitat. But these things can be fulfilled in a variety of habitat types ranging from mountain meadows, high elevation alpine and subalpine habitats, and mid to low elevation coniferous forests (Snyder 1991). The project area is not within a Grizzly Bear Management Unit and is not considered Core habitat.

A wolverine was documented near St. Joe Baldy in 2003 (IDFG 2003). In addition, three Idaho Fish and Game employees reported tracks and/or sightings in the Silver Valley Area in 1981, 1986, and 2003. There was an unverified sighting of a wolverine adjacent to the project are in 1990. Because of their large home range sizes and the very long dispersal distances of juvenile males, it is possible a wolverine may pass through or use part of the project area. Knowledge of wolverine habits, habitats, and behaviors is increasing every year. Some general assumptions about this species include negative association with roads and clear cut forest stands (Hornhocker and Hash, 1981; Hash 1987; Copeland et. al 2007). The high density of existing roads and the consistent use by people for recreation and resource extraction make the habitat in the project area and vicinity marginal at best. There is no historical or potential denning habitat in the project area.

It is possible that lynx, grizzly bear, or wolverine may pass through or temporarily use the project area, but it is not likely that any of these species would inhabit the project area with any regularity. Habitat for all three species would be considered marginal because of the high degree of human development and disturbance.

Other BLM Special Status Species

Very often, species that are habitat specialists are BLM Special Status Species or Idaho State Listed Species of Greatest Conservation Need. Their populations tend to be less secure because loss of their specialized habitat results in more dramatic population declines and higher rates of extinction (R.L.Smith 1992). With its variety of habitat types, the project area is occupied by several of these Special Status Species.

A review of geographic species observations in the Animal Conservation Database indicates that there has been one observation of fisher within 4 miles of the project area. Also Idaho giant salamanders have been documented nearby in Pine Creek and Highland Creek.

Some of the species listed in Table 7.8.7a prefer dense, interior forest stands. For example, the Northern Goshawk, and fisher prefer this habitat for some or all of their life history requirements. Goshawks are forest raptors that nest in relatively dense forest stands with canopy closure greater than 75% (Moser, B.W 2007).

Other species in Table 7.8.7a are primary or secondary cavity users, so they require snags. Flammulated Owls, Lewis' Woodpecker, and White-headed Woodpecker are cavity nesters and are generally found in lower elevation dry conifer or mixed conifer forests (Rodewald 2015).

Cassin's Finch are also found in mixed forests at all elevations, but they prefer to nest in spruce and fir forests or Douglas-fir and pine forests (Rodewald 2015). This little song bird eats the buds and seeds of most conifer species (Rodewald 2015). Olive- sided Flycatchers are found on the edges of naturally occurring forest openings or openings created by fire or logging. They are often associated with higher elevation brush fields and forest edges. They hunt for flying insects while perching high in a snag or tree at the edge of a clear cut, or in the middle of a burn area. Their nest is built on a horizontal conifer branch (Rodewald 2015).

The fisher is a small carnivore in the weasel family. They prefer the interior habitat of more dense coniferous forests. Often these forest stands are older, more moist, and at middle to high elevations. They have also been associated with riparian areas in Idaho (Ruggerio et. al 1994). They eat small to medium sized mammals, birds, and carrion. Fisher habitat often includes an abundance of logs, snags, and forest debris. A diversity of tree sizes and shapes and small forest "gaps" are also characteristic of fisher habitat (Ruggerio et. al 1994). Like wolverines, female fishers raise their young in natal and maternal dens. Natal dens are where the young are born. Maternal dens are additional den sites the mother may move her kits to if she feels threatened by predator presence or needs to move kits to an area where food is more available (Ruggerio et. al 1994). Very few denning sites have been described for fisher in the western United States, but logs and snags are commonly used (Ruggerio et. al 1994). The densely stocked east side of the project area may be suitable habitat for this species which has been documented several times in the vicinity of the project area.

The northern alligator lizard is relatively rare and one of only a few reptiles found in the Idaho Panhandle. The alligator lizard is a habitat specialist that can occur in many

different upland habitats, but is limited to those habitats that have talus slopes, or rocky outcrops (IDFG 2005).

The Coeur d'Alene salamander is associated with three habitat types; waterfall spray zones, springs and seeps, and stream edges. In wet weather they may be found under leaf litter, logs, and bark (IDFG 2005). Forest sites where they have been documented have at least 25% canopy cover but can be highly variable in cover type; from ponderosa pine to hemlock (Montana Fish, Wildlife, and Parks 2009). Because they respire through their skin, the most important habitat component for the Coeur d'Alene salamander is moisture and humidity (IDFG 2005). On the project site, other types of salamanders would be located in perpetually wet areas, such as a seep, spring, creek, or waterfall spray zone.

The bat species in Table 7.8.7a are habitat specialists because they require roosting and hibernating habitats that are very specific in their temperature and airflow requirements (Adams 2003). Often bat population sizes and demography, roosting sites, and life history requirements are not well known. This lack of knowledge leads most wildlife and land managers to take a more conservative approach when it comes to actions that may impact these bat species or their habitats. There are 9 known mines in the project area, some of which have multiple adits. Other unknown shafts may exist in the project area and may be used by bats as day roosts, night roosts, hibernaculums (hibernating areas), or maternity roosts. Some species that use snags, loose bark, cavities, or foliage for roosting may also be present in the project area. California myotis (myotis is a type of bat) prefer dry conifer sites, and they may use the project area for foraging. They may also roost under loose tree bark (Adams 2003). The fringed myotis, which is relatively rare in north Idaho, is most likely to be found in low elevation ponderosa pine. Little is known about its roosting habitat requirements, but snags are one likely source in spring, summer, and early fall (Adams 2003). Townsend's big eared bat may use the project area for foraging and roosting. Man-made structures may be used during the summer months as well (Adams 2003). The long-legged myotis and long-eared myotis are both forest dwelling bats that use snags, caves, mines, and sometimes structures as roosts (Adams 2003). The project area may provide both foraging and roosting habitat for these two species.

Migratory Birds

A variety of forest stands on the project site provide foraging and nesting habitat for numerous neo-tropical migrants in spring and summer and resident birds throughout the year. Western Tanager, Swainson's Thrush, Pine Siskin, MacGillivray's Warbler, Orange- crowned Warbler, Evening Grosbeak, Hammond's Flycatcher, Red-breasted Nuthatch, Pileated Woodpecker, two chickadee species, Chipping Sparrow, Northern Pygmy Owl, and Townsend's Warbler and Townsend's Solitaire were among the species documented during one site visit. A comprehensive breeding bird survey would likely reveal use by many more migratory bird species.

Migratory birds in the project area use a variety of habitat types for nesting and foraging. These sites include mixed coniferous forests, the shrubby forest understory, and sunny forest openings with grasses and shrubs. These birds may nest in coniferous trees,

from near to ground level up to the highest branches. They may be secondary cavity nesters, or nest on the ground. While many migratory bird species may be found on the project site, this analysis will focus on those species of particular concern, including BLM Special Status migratory birds, and Idaho Fish and Game Species of Greatest Conservation Need.

Other Wildlife

Sign of elk, moose, deer and black bear were found throughout the project area. These species are generalists and can be found in a wide array of vegetative communities from brushy clear cuts, to dense forests with little understory. Rocky Mountain elk prefer winter habitat that is composed of 60% forage and 40% cover (Thomas 1979). Areas with high canopy cover and little forest understory would not be considered productive foraging areas, but they are valuable as security areas and thermal cover areas during winter months. (Peek et. al 1982). South-facing slopes with vigorous brush fields and nearby escape cover, provide vital winter range for elk, while high elevation brush fields provide equally important transition range providing nutrition that elk need to improve their body condition prior to winter (Innes 2011). Peek et. al (1982) found that elk tend to use forage areas within 1200 feet of cover.

Habitat quality is the most influential factor in the population of any wildlife species. This is especially true for Rocky Mountain elk. Because wildfires are less common on the landscape then they would have been historically, timber harvest has become a surrogate for fire. However, timber harvest can be either beneficial or harmful to elk populations depending on the way harvest is implemented and the state of habitat adjacent to the harvest area. The following information was taken from the 2014 Idaho Fish and Game Elk Management Plan (IDFG 2014):

"Timber harvest can have both positive and negative impacts on elk. Timber harvest and roads associated with logging cause surface disturbance to soils and ground litter, and alter the amount of coarse woody debris on the forest floor. Disturbed soils along roads and in logged areas are prime spots for invasive weeds to colonize. The increase in the number of roads amplifies elk vulnerability due to the increase in human activity. Loss of security cover due to timber harvest causes elk to become more vulnerable to predators and hunters (Christensen et al. 1993). On the other hand, timber harvest can increase nutritional quantity and quality of forage (Collins and Urness 1983). Changes in forage relate to the inverse relationships between forest cover and understory vegetation production (McConnell and Smith 1970). Timber harvest has the greatest potential to benefit elk when few new roads are built or roads are closed once harvest is complete, adequate security cover is preserved, and size of openings are considered (Lyon and Christensen 2002)".

The land surrounding the project area and within the Pine Creek Watershed has been heavily impacted by timber harvest, mining, and recreation. Currently there is more forage habitat than cover habitat available to ungulates within the analysis area, particularly to the west and east.

This project site provides necessary habitat components for wolves, mountain lion, bear, grouse, wild turkey, bobcat, and numerous small mammal species. All of these species take advantage of many vegetation communities and their presence is largely influenced by the presence of humans. Areas with significant human disturbance are less likely to be used by many wildlife species (Steidl and Powell 2006).

7.8.2 Environmental Effects from Alternative A (Proposed Action):
Silvicultural Treatments

The following table indicates the medium to long term effects of the silvicultural prescription of the project on Special Status Species. For the purposes of this analysis, medium to long term is defined as from 2-30 years after project implementation. Discussion of the medium to long term effects and short term impacts of project implementation are described in more detail below.

Table 7.8.7b: Medium to long term effects of the Proposed Action on Special Status Species in the project area.

Species	Positive Effect	Neutral or No Effect	Negative Effect
Bald Eagle[B]		X	
Northern Goshawk[B]*	X		X
Flammulated owl[B]	X		
Lewis' woodpecker*[B]	X		
White-headed woodpecker[B]	X		
Common nighthawk*		X	
Olive-sided flycatcher*[B]	X		
Cassin's finch[B]		X	
Wolverine*[B]		X	
Fisher*[B]			X
Silver-haired bat*		X	
Townsend's big-eared bat*[B]		X	
Long-eared myotis*[B]		X	
Long-legged myotis*[B]		X	
Hoary bat*		X	
Western small-footed myotis*[B]		X	

Species	Positive Effect	Neutral or No Effect	Negative Effect
Coeur d' Alene Salamander[B]		X	
Idaho giant salamander[B]		X	
Northern leopard frog*		X	
Western toad*		X	

** Threatened, Endangered, Proposed, or Candidate Species, * IDFG species of Greatest Conservation Need, [B] Bureau of Land Management Type 2 Special Status Species

Indirect and Direct Effects- Threatened, Endangered, and Candidate Species

It is possible that Canada lynx, grizzly bear, or wolverine may pass through or temporarily use the site, but it is not likely they would inhabit the site with any regularity.

Thinning and burning may promote colonization of an area by snowshoe hare, the primary prey of Canada lynx, or may eliminate them from the area depending on the timing of the action. If the site is already colonized by hares then these actions would be detrimental to lynx foraging areas, but if they are not yet in the area and the stand is greater than 30-40 years old, thinning and burning my make the habitat more agreeable to hares in the long term (10-15 years post implementation) (Ruggerio 1994).

While grizzly bears can make use of many different habitat types throughout the year, roads are a known negative impact to this species. Road density has a negative effect on numerous wildlife species including big game, forest carnivores, and nesting birds. The proposed action includes 2.4 miles of new construction and 5.72 miles of existing road renovation. In addition, there are 5.9 miles of trails in the project area. After project completion, 2.9 miles of road would be decommissioned resulting in a net loss of 0.5 miles of road for the project area. Road construction would negatively impact wildlife because of direct habitat loss and disturbance during use. Once the project is completed and roads are decommissioned there should be a net benefit to wildlife because access by motorized vehicles would be reduced. This assumes that post project closure of the roads is effective.

The high density of existing roads and trails and the consistent use by people for recreation and resource extraction make the habitat in the project area and vicinity marginal at best for wolverine. If a wolverine was present during project implementation, it is likely the individual(s) would move away from the disturbance and any effects to the animal would be of very short duration and low to moderate intensity. Because there is no denning habitat within the project area, no impacts are expected. Indirect effects to wolverine are largely related to foraging and dispersal habitat quality. While road density would decrease once the project is complete, there are existing ATV trails and roads within the project area. Improvements to existing roads would likely

result in continued authorized and unauthorized use of the road system and may increase over time. This would result in further reduction in quality of habitat that is already marginal for wolverine.

If a grizzly bear, Canada lynx, or wolverine did pass through the area at the time of implementation, they would likely be disturbed enough to leave the project site. This is highly unlikely, but if it did occur, it would not result in any significant or long lasting impact to the animal.

Direct and Indirect Effects- Special Status Species and Migratory Birds

Effects on BLM Special Status Species and IDFG Species of Greatest Conservation Need and Migratory Birds would vary throughout the project area. Where one species may be negatively affected by forest canopy reduction, another species may benefit. For example, aggressive tree removal negatively affects Varied Thrush, Townsend's Warbler, and Hammond's Flycatcher (Rodewald 2015). However Olive-sided Flycatcher, Yellow Warbler, and MacGillivray's Warbler would benefit from tree removal once the shrub community responds to increased sunlight and decreased competition with trees (Rodewald 2015). Opening the canopy would benefit any existing hardwood trees like birch and aspen. This, in turn, would benefit Red-naped Sapsucker, as well as Northern Goshawk, and Flammulated Owl (Rodewald 2015).

Removal of dead and dying trees would have short term negative impacts on cavity nesters, woodpeckers that use these insect infested trees as a food source, and bats that use the snags for roosting. However, retention of snags as proposed and as directed by the Coeur d'Alene Field Office Resource Management Plan should provide enough cavity availability to accommodate primary and secondary cavity users. In addition, mortality of trees due to root rot, insects, and disease would ensure a continuous supply of dead and dying trees for cavity dependent wildlife. Minimizing snags that must be cut because of safety, and minimizing post project loss of snags due to blow down, would help ensure that sufficient snags are available to cavity dependent wildlife.

Short-term negative impacts to cavity dependent wildlife would occur at the time of harvest when birds and bats may be using the cavities for nesting or roosting. Cavity nesting birds, such as chickadees and nuthatches, tend to nest earlier in the season because they are often resident bird species and because their nests are protected from inclement weather typical of early season nesting conditions. Prohibiting logging between March and mid-July should mitigate some of the losses for resident and migratory birds, as many species will have had at least one nesting attempt by that time. In the medium to long term, snag availability and the recruitment of new snags on the site should be sufficient to accommodate the demand by cavity users.

Negative impacts to the Northern Goshawk and Fisher can be expected in portions of the project area. Northern Goshawk prefer interior dense forests for nesting (Moser 2007, Rodewald 2015). Goshawks nest in closed canopy forests on moderate slopes (Moser 2007). However, Moser (2007) found timber harvest did not affect territory re-

occupancy post timber harvest, as long as more than 39% of the 420 acre territory contained potential nesting habitat. Portions of the project area would meet that requirement, particularly areas near the bottom of the east side of the ridge. Additionally, reserve areas outlined will provide some habitat that is suitable for nesting adjacent to foraging habitat. Northern Goshawk would receive some benefit from new forest openings that can be utilized for hunting (Rodewald 2015). Harvesting timber outside of the nesting period would reduce potential imapcts to nesting birds or their offspring. If active nests are found before April 1 or after July 15 they would be buffered to reduce disturbance.

Fisher prefer older growth forest stands where rodents and birds are abundant (Ruggerio et. al 1994). Many portions of the project area are likely unsuitable for fisher. But the denser stands on the east side of the project area may be suitable for fisher use. Tree removal and the reduction of downed woody debris would reduce habitat suitability for fisher (Ruggerio et. al 1994). Woody debris should be left on site, in particular, large diameter logs. Firewood harvest by the logging company and the public should be minimized or controlled so that sufficient structure is left for fisher and other wildlife species like grouse, bears, and salamanders that use logs as habitat.

In the short term, bats like the myotis species listed in Table 7.8.7b that use dead or dying trees as roosting sites would be negatively affected during implementation of the project. Mortality is likely for those roosting in a harvested tree. Some bats may escape as the tree is falling. Over the medium to long term, enough snags would be retained and sufficient recruitment of new snags resulting from insects and disease would provide roosting habitat needed to support bat populations in the project area.

Most negative impacts to aquatic species like the Coeur d'Alene salamander, tailed-frog, and Idaho giant salamander would be avoided by stream buffers and road construction standards. If new and existing roads are not properly constructed or maintained, then erosion into streams may increase as a result of logging activity and public use. This would decrease habitat quality for Idaho giant salamander and tailed-frogs that utilize high-gradient, cold, low- sediment stream habitats. As proposed, the project should have little to no impact on these species.

Anytime vegetation is removed during the nesting season, bird mortality or nest failure can occur. Mortality to birds can be reduced by limiting vegetation removal to before April 1st or after July 15th. While some individuals would still be impacted if they are nesting late or attempting a second clutch, observing these dates would significantly reduce mortality risk to a majority of nesting birds in the project area.

Special Status Species that prefer more open canopy forest with a productive understory would benefit from the proposed project. Flammuated Owls have not been documented in the project area, but the proposed action should improve habitat for this species. The southern portion of the project area, which is south-facing and would be broadcast burned would be especially suitable for this species once the project is completed. Calliope Hummingbird, Lewis' Woodpecker and White-headed Woodpecker, which prefer open pine forests with large diameter trees, would also benefit from the restoration of warm dry forest types on the west and southern portions of the project area.

Common Nighthawk and the Olive-sided Flycatcher are aerial insectivores that would most likely be impacted by the project if nesting habitat is impacted during construction. Limiting harvest between April and July would help ensure the mortality to these two species is reduced. Olive-sided Flycatchers prefer forest edges and openings thus they would likely benefit from this project. Common Nighthawks are habitat generalists that would neither benefit or be negatively impacted by habitat effects from the proposed project.

Other migratory bird species that do not prefer open canopy forest, such as Varied Thrush, Hammond's Flycatcher, and Pacific Wren would not benefit from the proposed project and would likely leave the areas that are harvested to find other areas of more dense forest.

Indirect and Direct Effects- Other Wildlife Species

Raptors

If undetected, raptor species, such as Merlin, Cooper's Hawk, Sharp-shinned Hawk, Barred Owl, and Great-horned Owl that are nesting during implementation may be disturbed by logging activities. Actions FW 2.3.1 and FW 2.3.2 in the Resource Management Plan require that forest structure and activities around any active raptor nests in the project area be buffered by 100 yards. This action would reduce mortality, nest failure, and disturbance until nesting is completed. However, if active nests are not found prior to implementation, eggs and nestlings may be lost if the nest tree is cut down. This likelihood can be further reduced by postponing logging as long as possible during the nesting season throughout the project area. Prohibiting tree falling until after July 15th would increase the likelihood that raptors have fledged their chicks before nest trees are felled.

Big Game

Opening up the canopy and reducing tree density would reduce thermal cover and security cover for big game. At the same time this would create more productive foraging areas for deer, elk, and moose. Portions of the project area are adjacent to private lands lacking in cover due to heavy historic timber harvest, tree removal is not likely to benefit big game in this forage rich environment. The proposed selective thinning would take mostly small diameter trees, and leave large healthy trees. Some level of canopy cover will remain and recovery of brush in the understory would not eliminate hiding cover entirely. But there will be a loss in thermal cover for big game animals, which is already in short supply in some areas of the Pine Creek Drainage. Productive winter range where cover is scarce has a reduced value if hiding and thermal cover is in short supply.

In response to these concerns the project includes some areas where thermal cover would be maintained. The project would include 159 acres of riparian reserve areas and 178 acres of wildlife retention areas. In addition there would be 934 acres of retention areas that are largely located along the low elevation portion of the east side

of the ridge. While not ideally located, these areas would keep cover intact and still allow for timber harvest at the mid-slope and high elevation portions of the ridge. Three ten-acre reserve areas on the east facing side of the ridge would be included where no harvest will occur (see MAP 2 – Treatment Areas). This would help to maintain areas of thermal cover amidst the harvest and in combination with riparian reserve areas would reduce impacts of thermal cover removal elsewhere in the project area. In addition, there would be a buffer along the lower portion of the ridge where harvest would be less aggressive and this area would serve as transition habitat between heavy harvest and unharvested habitat along the lower portions of the ridge (see MAP 2 - Treatment Areas).

In general, elk avoid roads with human activity and avoid disturbances created by active logging operations (Skovlin et. al 2002). Elk avoid areas near roads open to motorized vehicles across a variety of seasons, landscape conditions, and geographic regions. Elk generally avoid habitat adjacent to roads, particularly during calving and hunting seasons and during the rut. As mentioned above, after project completion the total miles of road open to motorized vehicles would decrease. During construction and implementation there would be more road miles in use on the project area than there are currently. This includes new construction and road renovation. During that time it is possible that use by big game animals will decrease until project completion. Ensuring that road decommissioning is effective in the project area, road use by motorized vehicles should decrease over time and thus security of elk in the project area should not be negatively impacted and may improve.

Prescribed Burning and Fuels Reduction Treatments

Indirect and Direct Effects

Effects of prescribed burning and fuels reduction treatment are very similar to other vegetation removal methods. Equipment and human disturbance, the removal of small trees and brush have the potential to destroy habitat for some species and create habitats for others. Activities associated with fuels reduction would include slashing brush and trees smaller than 6-8 inches in diameter, constructing fire lines, and prescribed pile burning and broadcast burning. Much of the southern portion of the project area would be treated with a broadcast burn to reduce fuels after the forest treatment.

The most significant and direct impact of fuels reduction would be to nesting migratory birds and the northern alligator lizard. If slashing, fire line construction, and burning occur during the nesting season, many birds would lose their nests, eggs, and nestlings. Delaying these activities as much as possible (until after July 15th) would best protect resident and migratory birds, game birds, and Special Status Species. There are numerous migratory bird species that are not Special Status and would also be impacted. Examples include Spotted Towhee, Ruffed Grouse, Song Sparrow, Chipping Sparrow, Yellow Warbler, Cedar Waxwing, and Gray Catbird (Kaufman 1996).

In order to ensure that a sufficient amount of woody debris remains on site post burn, logging activities should be implemented in a manner that leaves larger diameter debris on site. Firewood harvest of downed logs or snags should be minimized, especially trees of larger diameter. Conducting the above described activities before April 1st and

after July 15th would provide a better opportunity for these birds to complete their nesting attempts successfully.

Where forest cover is abundant and forage is lacking, fuels reductions and burning would benefit many wildlife species that prefer brush and an open forest canopy. Ungulates in particular, will enjoy many benefits from prescribed burning of old decadent brush and broadcast burning of the forest understory (Innes 2011). Existing brush would have higher forage value once burned. Where the understory has not been vigorous because of shade, burning would induce vigorous growth of the shrub, forb, and grass understory (Innes 2011 and Hooker and Tisdale 1974).

Species that prefer more closed canopy conditions or more mature brush for nesting sites would be negatively affected by a broadcast burn. These species would include those addressed above in the discussion of silviculture treatment effects on wildlife. Examples include Dusky Grouse, fisher, and Varied Thrush.

7.8.3 Cumulative Effects:

The cumulative impacts analysis area for wildlife includes the East Fork of Pine Creek watershed. This area encompasses 29 square miles and was selected to incorporate the large ranges of big game species and carnivores, without being so large as to dwarf potential impacts to species with very small ranges like song birds, reptiles and amphibians.

Portions of the analysis area and vicinity represent a highly disturbed and significantly modified landscape. Aggressive logging on adjacent private lands, mining activities, human infrastructure, and the human activity associated with the town of Pinehurst have resulted in significant disturbance to and modification of habitat. Historic and continuing activities in the action area that have impacted wildlife populations include logging and forest health projects, wildfires, forest pathogens, prescribed fires, mining, recreation (consumptive and non consumptive), road and trail building, rural and urban development along the East Fork of Pine Creek. All of these activities have the potential to negatively affect wildlife species. Some of these actions have positively benefited wildlife species.

Mining activities increase human access and disturbance in some areas. Logging and forest health projects temporarily increase disturbance and may permanently increase access to hunters and recreationists. These projects have the potential to both positively and/or negatively affect wildlife species depending on their habitat requirements. For example, fisher would be negatively impacted by aggressive tree cutting in a dense forest stand, whereas big game animals and McGillivray's Warblers would benefit from opening the forest canopy.

Reasonably foreseeable actions in the analysis area include possible timber harvest where merchantable timber remains, forest health projects, and mining activities. Mining activities can also be expected to continue within the area at the levels currently occurring. Consumptive and non-consumptive recreation can be expected to continue at similar levels occurring today and a low level of human development is likely to continue in the Pinehurst area and the Interstate 90 corridor. Forest insects and

disease will continue to cause tree mortality in the analysis area. If no action is taken, these trees will eventually fall and regeneration of early seral species would be expected.

In general, the loss of interior forested habitat is a concern for species like fisher and boreal owl. If a stand replacing fire is avoided because of the reduction of dead and dying fuel, the benefit of the project could outweigh the reduction in cover. The reduction in cover will be far less than a reduction seen after a forest fire. However, if one assumed that no stand-replacing fire would ever occur, the effects of this project on interior forest species are negative and these species are likely to decrease over time in the analysis area. Species that prefer a more open forest, brush fields with little or no tree canopy, or areas with large openings of even-aged regenerating conifers are likely to increase in the analysis area because of continued forest projects that reduce the canopy and the eventual loss of trees due to insects and disease. Species that prefer open dry- warm forest with the presence of large diameter trees have little habitat available in the drainage because timber harvest on adjacent private lands and State owned lands tends to remove all trees on the site. These activities are likely to continue on State and private timber lands.

The small scale of the project, coupled with the already disturbed landscape should have no significant effect on Special Status wildlife populations in or around the project area. In fact some species such as Calliope Hummingbird and Flammulated Owl will benefit if the proposed action is implemented. Impacts of the above activities, paired with the proposed project are not expected to contribute to negative cumulative effects on any Special Status wildlife species populations.

7.8.4 Environmental Effects from Alternative B (No Action):

Endangered, Threatened, or Candidate Species

Canada lynx, grizzly bear, and woodland caribou have not been documented in or near the project area. Suitable habitat for woodland caribou is not located in or near the project area. Woodland caribou require high elevation old growth forest and a sufficiently developed lichen community for winter survival (Servheen and Lyon 1989). This area does not hold potential for providing habitat for this species because the elevation and the vegetation community will never progress towards suitable habitat. There would be no effect on this species regardless of which alternative is selected.

Canada lynx are highly associated with both late and early succession forest stands. Early succession, densely stocked stands provide foraging habitat, while mature forest stands act as potential denning habitat (IDFG 2005, Ruggerio 1994). Thinning and burning may promote colonization of an area by snowshoe hare, the primary prey of Canada lynx, or may eliminate them from the area depending on the timing of the action. If the site is already colonized by hares then these actions would be detrimental to lynx foraging areas, but if they are not yet in the area and the stand is greater than 30-40 years old, thinning and burning may make the habitat more agreeable to hares in the long term (10-15 years post implementation) (Ruggerio 1994). Selection of the “no action” alternative would reduce any possibility of temporary disturbance to lynx during

implementation. Likewise there would be no changes (positive or negative) in the existing habitat, which appears to be unoccupied. If a stand replacing fire were to occur on this site, the regenerating forest could provide good habitat for high numbers of the primary prey species for lynx, the snowshoe hare. However, because there is little, if any, potential denning habitat within the analysis area, benefits to foraging habitat would not likely have any significant positive impact on lynx populations or individuals in the future.

Of the three listed species, grizzly bear would be the most likely to use or pass through the project area. However, the current project area is less than suitable habitat for grizzlies because of the high level of human presence, development, and disturbance.

The “no action” alternative would eliminate the possibility of any direct effects to grizzly bears in the unlikely event one was in the project area. There would be no additional road building. But there would also be no road decommissioning under this alternative either, thus road miles open to motorized use would not decrease as under Alternative A. If no forest is thinned and no prescribed burn occurs, ungulates will not benefit from more productive forage on the landscape and grizzly bears would not indirectly benefit from increased ungulate use and possibly increased ungulate numbers. Conversely, no cover would be reduced in areas that are already somewhat lacking in this habitat element. Portions of the area may experience less use by ungulates if cover is not present near forage and therefore, no action would be best in this scenario.

Other Special Status Species

Mortality to wildlife due to machinery and tree falling, as well as disturbance from human activity would not occur under the No Action alternative.

If the No Action alternative is selected, an increase in the number of dead and dying trees is expected. As a result, the likelihood of a stand-replacing fire would also increase. Those wildlife species that require snags, prefer more dense forest stands, and rely on forest insects would be positively affected if this alternative was selected. For example, pileated woodpeckers in the short term, would have a higher density of insect infested trees to forage in, as well as numerous available cavities to choose from. However, this benefit would be negated in the long term for many of these species if a stand- replacing fire were to occur that reduced large diameter trees in the project area.

Where there is less forest cover available nearby, “no action” would most likely be a preferred alternative for those species requiring more forest cover where it is already lacking. Examples include Northern Goshawk and fisher.

Special Status Species that prefer more open stands with a brush understory or the presence of hardwoods would not benefit from selection of the “no action” alternative. Examples include, Olive-sided Flycatcher, Red-naped Sapsucker, Flammulated Owl, MacGillivray’s Warbler, and Yellow Warbler. If a stand replacing fire were to occur because of the existing high fuels levels and the density of dead and dying trees, these

species would eventually benefit from no action. Some species, such as Northern Goshawk and Great Gray Owl would be both negatively and positively affected by no action. On the one hand, they prefer more dense forests for nesting. But they also use forest openings and less dense forest for hunting. If a stand replacing fire were to occur, nesting habitat would likely be destroyed but foraging habitat may increase.

Table 7.8.7c below, illustrates the projected short term effects on the special status species that would occur if no action is taken. This table does not assume that a stand-replacing fire would eventually occur. Analysis of impacts to species due to a future stand replacing fire can be found within the text of this section.

Table 7.8.7c

Species	Positive Effect	Neutral or No Effect	Negative Effect
Bald Eagle[B]		X	
Northern Goshawk[B]*		X	
Flammulated Owl[B]			X
Lewis' Woodpecker*[B]			X
White-headed Woodpecker[B]			X
Common Nighthawk*		X	
Olive-sided Flycatcher*[B]			X
Cassin's Finch[B]		X	
Wolverine*[B]		X	
Fisher*[B]	X		
Silver-haired bat*		X	
Townsend's big-eared bat*[B]		X	
Long-eared myotis*[B]		X	
Long-legged myotis*[B]		X	
Hoary bat*		X	
Western small-footed myotis*[B]		X	
Coeur d' Alene Salamander[B]		X	
Idaho giant salamander[B]		X	

Species	Positive Effect	Neutral or No Effect	Negative Effect
Northern leopard frog*		X	
Western toad*		X	

** Threatened, Endangered, Proposed, or Candidate Species, * IDFG species of Greatest Conservation Need, [B] Bureau of Land Management Type 2 Special Status Species

If the "no action" alternative is selected, none of the negative or positive effects described in the preferred alternative above would influence ungulate habitat. The area would continue to provide thermal cover and hiding cover. It would also continue to be a lower quality foraging area for ungulates, particularly on the east side of the ridge. In the short term, the no action alternative is likely to be the most beneficial to ungulates. The areas that are currently harvested or are likely to be harvested provide ample foraging habitat, while the unharvested areas, which are becoming lower in abundance in the analysis area, provide thermal cover and hiding cover. In the long-term, a stand replacing fire would provide high quality foraging habitat for elk and deer, but would also reduce the thermal and hiding cover available.

7.8.5 Cumulative Impacts (no action):

Under this alternative, there would be no negative cumulative impacts to Federally listed or other Special Status Wildlife Species, including migratory birds as a result of the project. The project area would be expected to continue to move towards climax forest conditions with moderate and increasing levels of recreation in the project area and in the larger analysis area. Insect and disease would continue to influence forest stand structure benefitting snag dependent species. Portions of the project area would become more densely stocked, benefitting interior forest species and those that require more cover, such as big game in winter. Species that require more open stands dominated by larger diameter mature trees would continue to decline. There would be no improvement to habitat for these species on 746 acres. Because the project area represents such a small portion of the analysis area for species that prefer more open mature forests, even the lack of benefit to these species from implementation of no action would not reach the level of significance.

7.9 Air Quality

7.9.1 Affected Environment:

The analysis area for air quality includes Idaho Airshed No. 11 (as defined by the Montana/Idaho Airshed Group) and adjacent airsheds that may potentially be affected by smoke emissions. Montana and Idaho are currently managing smoke emissions for forest and prescribed burns under the Montana/Idaho Smoke Management Group. The

Operating Guide for the Montana/Idaho Smoke Management Group is based upon the Environmental Protection Agency Interim Air Quality Policy on Wildland and Prescribed Fires. The Smoke Monitoring Unit coordinates prescribed burn activities through meteorological scheduling in order to ensure that cumulative air quality impacts are minimized.

Air quality impacts due to prescribed fire smoke result from a combination of emission production and atmospheric dispersion (Sandberg et. al 2002). Dispersion is dependent on meteorological conditions including seasonality, large-scale prevailing wind patterns, atmospheric stability, and local terrain-influenced weather patterns. The Smoke Monitoring Unit utilizes dispersion forecasts as a tool for making daily burn recommendations to members of the MT/ID Smoke Management Group.

The Clean Air Act requires that the Environmental Protection Agency (EPA) identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. Each state is also required to develop an implementation plan to maintain air quality. The EPA has issued National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead and particulate matter 10 microns in diameter or smaller (PM 10) and 2.5 microns and smaller (PM 2.5) (Table 7.9.1). The Idaho Department of Environmental Quality (IDEQ) has included an additional standard for fluorides, bringing the applicable standards in Idaho to seven.

Table 7.9.1 National Ambient Air Quality Standards for PM 10 and PM 2.5

PM_{10}	24-hour average	150µg/m^3
	Annual arithmetic Mean	revoked
$PM_{2.5}$	24-hour average	35µg/m^3
	Annual arithmetic Mean	*12µg/m^3

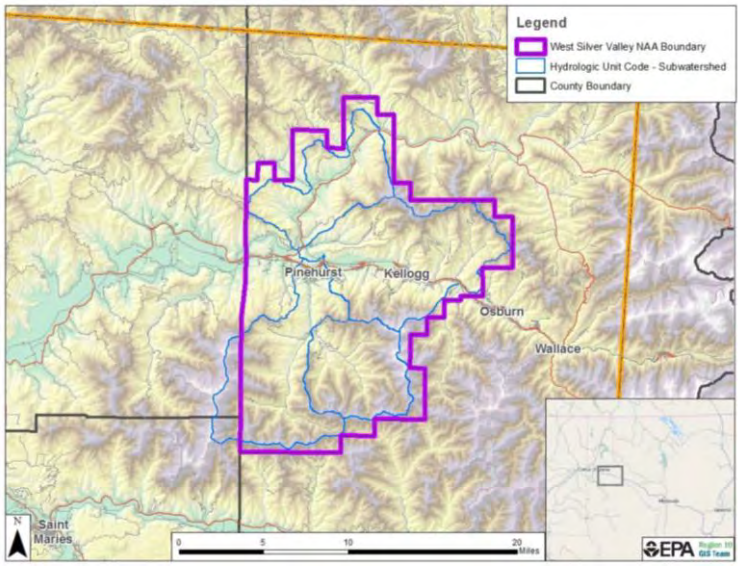
*On December 14, 2012, the EPA promulgated a revised primary annual PM2.5 NAAQS (78 FR 3086, January 15, 2013). In that action, the EPA revised the primary annual PM2.5 standard, strengthening it from 15.0 micrograms per cubic meter (µg/m3) to 12.0 µg/m3.

The Lynch Gulch project is located within the West Silver Valley non-attainment area (See Map 6 - fuels). The EPA designated the West Silver Valley area as nonattainment for the 2012 annual PM2.5 standard. Residential wood combustion in the cold, winter months is most responsible for elevated particulate matter in the area, while prescribed burning in the late autumn and in the spring also contributes substantially. Smoke from

wildfires can affect the area in the summer. Smoke from crop residue burning is a negligible contributor to PM2.5 in the West Silver Valley.

The closest Class I air quality area—sensitive areas such as hospitals, airports, wilderness areas—near the project area, is Cabinet Mountains Wilderness, approximately 40 miles northeast of the project area. Class I areas receive the highest levels of protection under the Prevention of Significant Deterioration (PSD) program. The PSD program is designed to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value.

Figure 7.9.1. EPA's Nonattainment boundary for the West Silver Valley Area.



7.9.2 Environmental Effects from Alternative A (Proposed Action):

The proposed action would require prescribed burning to reduce fuel loadings to an acceptable level. The resulting smoke would affect air quality. Four methods of prescribed burning would be used to accomplish fuel load reduction:

1. Underburning would be used to reduce natural fuel accumulations. The objective is to reduce fuel loading while protecting the residual overstory trees from damage due to heat and flames. Choosing cooler prescription windows will limit the amount of fuel that in consumed as well as duration of the smoldering phase. This method of burning produces fewer emissions.
2. Underburning would be used to reduce natural and slash fuels from logging activity. The objective is to reduce fuel loading while protecting the residual overstory trees from damage due to heat and flames. Fuel loadings are slightly higher than natural fuel units, but lower than typical slash fuel models due to whole-tree yarding methods that concentrate the majority of slash material at

landing sites. Since the burning is deliberately cool and slow, combustion is likely to be inefficient. More particulate matter per acre of fire is often produced with this method of burning than with other methods.

3. Hand pile burning would be used for cleanup of fuels created from the understory thinning and pruning activities in the fuelbreak. Hand piles are generally small and are burned after a season of curing when the fuel moistures are low resulting in efficient combustion, thus lessened particulate matter. This method produces the least emissions.
4. Landing pile burning would be used for timber sale activity created fuels. This type of burning concentrates slash in specific locations to minimize activity costs and reduce risk to residual trees. Slash is gathered and piled mechanically throughout the unit or at the landing. Piles are burned after a season of curing when the fuel moistures are low resulting in efficient combustion, thus lessened particulate matter. Due to the efficiency of fuel consumption in large piles, this type of burning has less effect on air quality compared to underburning slash.

Particulate emissions production was calculated using the First Order Fire Effects Model (FOFEM). FOFEM predicts the quantity of natural or activity fuel consumed by prescribed fire and the resultant emissions. Fuel loadings are derived from forest cover type classifications as represented in the analysis area. FOFEM operates under the assumption that the entire area of concern experiences fire. For discontinuous burns, the results should be weighted by the percent of the area burned. For the purposes of this analysis, it is assumed that 60 percent of the acres to be treated by fire would actually produce particulate emissions.

The assumptions and methods used in FOFEM for modeling emissions were taken from Reinhardt, et. al (1997). Emissions production depends both on fuel consumption and on the combustion efficiency of the fire. Therefore, it is important to note that emissions quantities are derived from tons of fuel consumed and not tons of fuel treated. FOFEM models emissions production, not visibility or dispersion. Categories of emissions estimated are PM 2.5 and PM 10. About 90 percent of PM 10 is actually in the PM 2.5 category (Peterson 2001). Idaho and Montana monitor for both categories, therefore the amount of both are modeled in this analysis.

Emissions for pile burn were calculated using the online piled fuels biomass and emissions calculator (Wright et. al 2010).

Table 7.9.2. Comparison of expected smoke production measured in PM2.5 and PM10 by burn type.

Burn Type	Acres treated	PM10 tons/acre	PM10 tons	PM2.5 tons/acre	PM2.5 tons
*Underburn natural fuels	163	0.1287	20.98	0.1092	17.80
*Underburn harvest units	350	1.785	624.75	0.1461	51.14
**Burn hand piles	72	0.0339	2.44	0.0296	2.13
**Burn landing piles	820	0.1308	107.26	0.1112	91.18

*Emissions calculated using FOFEM

**Emissions calculated using the online Piled Fuels Biomass and Emissions Calculator

The Smoke Monitoring Unit coordinates prescribed burn activities through meteorological scheduling in order to ensure that cumulative air quality impacts are minimized. The different types of burning would be conducted during different burn windows, so would not impact the non-attainment area at the same time. Spring burning windows typically occur during warm weather, when there is less of a need for residents to heat their homes.

Indirect effects would be a long-term decrease in fuel loading following implementation of the project. Therefore, there is likely to be a decrease in particulate matter emissions and the impairment of visibility from wildfires when they occur (See table 7.9.3).

Table 7.9.3. Comparison of wildfire emissions between the proposed action and the no action (FOFEM).

	Biomass Consumed tons/acre	PM10 tons/acre	PM2.5 tons/acre
Wildfire (Proposed Action)	5.8	0.15	0.177
Wildfire (No Action)	22.2	0.4615	0.545

Mechanical fuel treatments and vehicle travel would increase the amount of dust in the area depending on the time of year, soil moisture, and the amount and kind of vehicle traffic. Treatments using mechanical activities may temporarily affect air quality within

and around the project area. The mechanical vegetation treatment would be accomplished using a variety of machines to modify the vegetative biomass in the project area as presented in the proposed action.

The primary effect to air quality from these activities would be the generation of dust on roads from vehicle traffic during dry periods from July to September. Road dust would be limited to the project area and the access roads. Air quality impacts from dust would be minor and short term with the application of BMP's.

Dust may have a short term affect to visibility and safety issues related to traffic on project area roads, but dust is not expected to interfere with traffic on local roads. Production of dust is temporary and occurs only while activities are taking place within the project area.

7.9.3 Environmental Effects from Alternative B (No Action):

There would be no direct effects on the existing condition of air quality from this alternative because no pile burning would occur. No particulate matter would be produced and visibility would not be impaired.

Indirect effects would be that fuel loadings continue to increase and wildfires would continue to occur. Wildfires tend to burn much larger acreages than controlled prescribed fire does. Also, wildfires are not planned around other wildfire events or meteorological conditions that would allow for dispersion and transport away from impact zones. Wildfire occurrence without previous fuel reduction is likely to produce two to four times greater particulate matter emissions than would be generated by prescribed fire (Quigley and Arbelbide 1997).

7.9.4 Cumulative Effects:

The cumulative effects area for air quality is Airshed 11. Consideration of cumulative effects for air quality takes a different approach than for other resources. Past activities in the analysis area don't necessarily require consideration, except in the sense that use of existing roads and facilities may contribute to fugitive dust levels as described above. Present use of and activities in the analysis area are continuing with a current assessment of good to excellent air quality.

Locally adverse and cumulative impacts to air quality could be expected if pile burning occurred in conjunction with on-going wildfires or other prescribed burning activities in and adjacent to the airshed. Other potential prescribed burning projects that could have an impact are listed in the beginning of this chapter (description of the past, present and foreseeable future actions). However, design measures and procedures outlined in the North Idaho Smoke Management Memorandum of Agreement are intended to increase the efficiency and effectiveness of communications about, and coordination of, prescribed burning to avoid adverse cumulative effects.

Dust impacts would be minimal due to the light nature of use of the roads, and minimal vehicles necessary for the project. Should a wildfire occur, substantial smoke, dust and ash would be produced thus affecting the airshed.

No Action

If a wildfire were to occur, the project area could burn. Depending on the intensity and type of fire the vegetation could make the wildfire hard to suppress due to the potential flame lengths and spotting produced. This could, in turn, contribute more smoke emission particulate matter to cumulative effects compared to the proposed action.

7.10 Soil Resources

7.10.1 Affected Environment:

The following soils information is summarized from the USDA-NRCS Soil Survey for St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties (USDA, 2002).

Soils within the project area are primarily mapped as three soil map units: Honeyjones-Ahrs association, Ahrs-Pinecreek association, and PineCreek gravelly ashy silt loam. All have similar properties as described below: The parent material is volcanic ash over colluvium derived from quartzite or other meta-sedimentary rocks. These soils are well-drained and deep and occur on mountain flanks. Slopes range from 25-75 percent and vary from convex to concave in across-slope shape. The typical soil profile is about 2 inches of surface duff overlying gravelly ashy silt loam grading with depth into extremely cobbly loam.

Potential for damage by fire is rated as low. This rating involves an evaluation of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer (please see description below).

Soils within the project area have been impacted by past logging, wildfires, mining and road building and ORV use. These impacts have resulted in varying levels of soil displacement, compaction and loss of productivity.

Potential for Damage by Fire

Prescribed burning is a restoration practice that is primarily designed to help return the natural fire cycle to the landscape. Properly carried out on suitable sites, burning can be a very effective and cost efficient treatment method to help restore the desired composition of plant species in an ecological site, reduce fuel loading, rejuvenate sprouting browse species and stagnant grass plants, release nutrients into the soil, and prepare an ash seedbed for artificial or natural seeding.

Potential for damage by fire (to nutrient, physical and biotic soil characteristics), as defined in the soil survey, “involves an evaluation of the impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter

in the surface layer. The potential damage ratings are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope." Within the project area, all of the soil types have a "low" susceptibility rating for potential damage by fire. "Low susceptibility" indicates that the soil has no features that are very favorable for soil damage by fire (USDA, 2002). The ratings are directly related to burn severity (e.g. a low-moderate severity burn will not result in water repellant layer formation).

Susceptibility to compaction

Compaction tends to reduce water infiltration which affects plant production and composition, increases runoff which generally increases erosion rates, and affects organisms living within the soil. Compaction is predominantly influenced by moisture content, depth to saturation, percent of sand, silt, and clay, soil structure, organic matter content, and content of coarse fragments.

The project area soils are rated as "low resistance" to compaction, which indicates that the soil has one or more features that favor the formation of a compacted layer.

Soil compaction associated with logging occurs in response to pressure exerted by machinery. The risk for compaction is greatest when soils are wet. Compacted soil usually allows less water to infiltrate, resulting in greater overland flow, with greater energy to transport soil particles, resulting in increased erosion. Soil texture affects the potential for soil compaction, which also can reduce plant productivity. In general, finer-grained soils can withstand less soil compaction before rooting restrictions occur (Megahan 2004).

Soil displacement reduces plant growth where topsoil and organic matter are removed. Road construction on steep slopes, as well as mass failures, will typically have the greatest soil displacement associated with timber harvest.

7.10.2 Environmental Effects from Alternative A (Proposed Action):

Construction of temporary roads would have the greatest impact on soils, followed by tractor and cable logging. Megahan et al. (2004) summarizes the reported soil disturbance from various logging systems in the Pacific Northwest and British Columbia; he found an average of 21 percent from tractor logging, 13 percent from ground cable logging, 8 percent for skyline logging, and 4 percent for aerial logging. Prescribed burning generally would have a much lower impact. Temporary roads would contribute most to cumulative erosion per acre of ground disturbance, but erosion would decline to negligible levels after decommissioning.

Construction of temporary roads would result in a loss of soil productivity in the short term until infiltration is restored by ripping or other decommissioning. Overall, the proposed action would result in a net reduction of road density, by 0.5 miles. The amount of tractor harvest acreage is relatively minimal. In addition, the tractor ground is located near a ridge top where gentle slopes and rock outcrops would minimize compaction, soil displacement, erosion and overland transport. The prescribed burns will be of low to moderate intensity to reduce the potential for fire damage to the soil and subsequent erosion.

7.10.3 Environmental Effects from Alternative B (No Action):

Under the No Action alternative**,** no soil compaction or displacement would occur as a consequence of road construction, timber harvest, or fuel reduction activities. Existing soil compaction and displacement would persist with slow natural recovery of surface layers of compacted soils. The possibility of a large stand replacing fire occurring is slightly higher under this alternative, which could result in a substantial increase in soil loss and sediment delivery to the stream channels in the project area. The continued accumulation of dead and down fuel loads could contribute to increased potential for locally severe fire effects on soil, including physical alteration of soil structure and development of hydrophobic layers. If wildfire occurred, mechanized suppression activities and subsequent salvage logging could create severe soil impacts, depending on fire characteristics and administrative decisions. .

7.10.4 Cumulative Impacts:

Of the past impacts to project area soils described in the affected environment, most are substantially reduced from historical levels, with the exception of ORV use. The additional impacts from Alternative A, with the mitigation described, would not substantially contribute to cumulative effects.

7.11 Water Resources:

7.11.1 Affected Environment:

The mean annual precipitation in the project area is 46 inches per year. Approximately half of the harvest area drains southwest towards the East Fork of Pine Creek, via Lynch Gulch, Nabob Creek and several unnamed face drainages; there is also a minor amount draining into the main stem of Pine Creek.

The other half of the harvest area drains generally northeast towards Little Pine Creek, via McKinley Gulch, Deer Lick Gulch, Idaho Gulch and several unnamed face drainages.

The Coeur d'Alene Basin has been a leading world producer of silver, lead and zinc. Mining –related contaminants, particularly lead, zinc, cadmium and arsenic, from historical practices have severely affected surface water, groundwater, soil, and sediments in large areas of the CdA Basin. Historical ore-processing activities resulted in large quantities of metal-rich tailings that were placed in and along streams. The

tailings have produced, and continue to produce, trace-metal-contaminated water and extensive deposits of trace-metal-contaminated sediment throughout the South Fork of the Coeur d'Alene River Basin (Donato, 2006).

The 2010 Integrated report from IDEQ lists the mainstem of Pine Creek and the East Fork of Pine Creek as section 303d-listed stream segments for non-attainment of beneficial uses. The causes identified are elevated sediment load and dissolved metals (lead, zinc and cadmium) which are commonly associated with historic mining in this region.

Little Pine Creek and Nabob Creek are conveyed through culverts to their confluences with the main stem of Pine Creek and the East Fork of Pine Creek (respectively) near Pinehurst, Idaho.

In addition to historical mining, other impacts to the project area streams include road construction, channelization, flooding, timber harvest and wildfires.

7.11.2 Environmental Effects from Alternative A (Proposed Action):

Proposed new road construction is 1.4 miles of temporary and 1 mile of permanent. Offsetting the 1.0 mile of new road, proposed road decommissioning (i.e., partial road obliteration) would total 2.9 miles, for a net decrease in road density of 0.5 miles.

The new roads (temporary and permanent) would be located either on ridges or high on the slope and away from any water courses.

The timber harvest activities would minimize impacts to soil and water quality through contract stipulations and BMPs, including: restrictions on tractor logging when soil moisture is greater than 25%, proper spacing of skid trails; limiting tractor yarding to slopes of 40% or less, and installing waterbars and other drainage measures as recommended by the hydrology or fisheries specialists.

Due to the drainage characteristics described in the Affected Environment, the BMPs and contract requirements described above, as well as the wide, untreated buffer area between the ground disturbing activities and any water courses, sediment delivery to a stream is unlikely.

7.11.3 Environmental Effects from Alternative B (No Action):

No timber harvest, burning or road construction would occur; consequently, soil and water quality would be unchanged from current conditions. There would be no reduction in road density as compared to the net loss described under the proposed action alternative. The possibility of a large stand replacing fire occurring is slightly higher under this alternative, which could result in a substantial increase in soil loss and sediment delivery to the stream channels in the project area.

7.11.4 Cumulative Impacts

Since there would be no direct or indirect effects, there would be no cumulative effects to water resources from the project.

7.12 Visual Resources

7.12.1 Affected Environment:

The Coeur d'Alene RMP designated the landscape in and around the project area as Visual Resource Management (VRM) Class III. The objective for this management class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The most likely place from which people would view the project area (the key observation point or KOP) is the Pinehurst Golf Course, located a little over a mile north of the project area. Only the northern-most portion of the project would be visible from the Golf Course. The ridge within this portion of the project area is the southern backdrop for most of the course (see Figure 7-1)

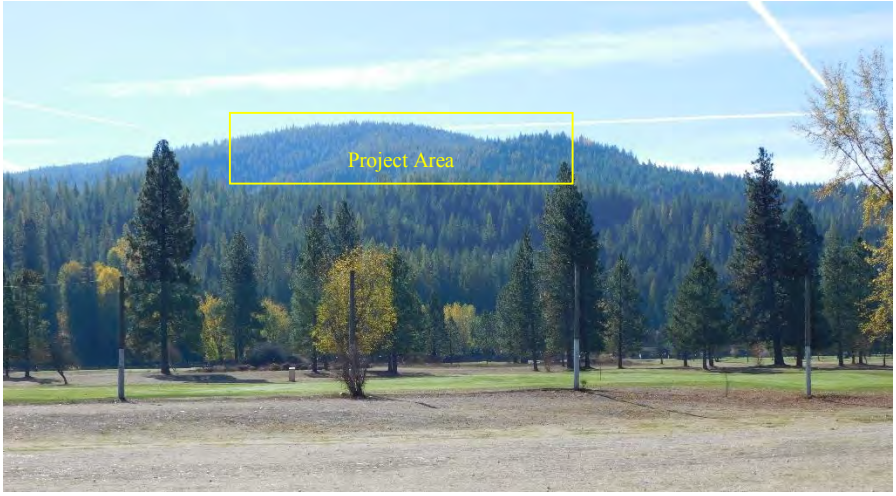


Figure 7-1**:** View of the Project Area from the Pinehurst Golf Course

Looking towards the project area from the KOP, the viewer sees rolling ridges with dense tree cover, at the distant edge of the foreground. There is a second rolling ridge, closer-in and lower (outside the project area), which is similar in appearance to the more distant ridgeline in the project area. The golf course itself is open grass with sparsely spaced conifer and broad-leaf trees.

7.12.2 Environmental Effects from Alternative A (Proposed Action):

The timber harvest, thinning, and creation of the shaded fuel break would open up some of the visible canopy along the ridgeline, making the vegetation slightly less dense. There would be little contrast with the rest of the landscape. To a viewer on the golf course this would likely be imperceptible or only slightly noticeable. If any large openings are created (i.e. removal of multiple adjacent mature trees) on the ridgeline or on the north-facing slope by the timber harvest, the contrast with the landscape would

be more noticeable. Large openings near the proposed spur road along the ridge would provide views of the road, which could attract more attention. However, even with these potential more-moderate changes to the landscape, the project area would continue to meet the VRM III objective. During the prescribed burn and when slash piles are burning, the smoke would be obvious and attract the attention of a casual viewer. However, this would only last 2 to 3 days while burning occurs.

7.12.3 Environmental Effects from Alternative B (No Action):

No timber harvest, burning or road construction would occur; consequently no Effects would occur to visual resources.

7.12.4 Cumulative Impacts

Past and present actions that affect visual resources (e.g. existence of the golf course and the town of Pinhurst) have resulted in the conditions described in the affected environment and are incorporated into the baseline conditions. Although not obvious from the KOP, timber harvests and other vegetation treatments have also occurred on other federal and private lands in the vicinity of the project area. While the effects on forest vegetation are either not visible or not noticeable from the KOP, all of these treatments generate slash piles. Usually the spring and fall windows, when weather conditions are favorable for burning piles, are brief. As a result, it is likely that, in the future, piles from other treatments would be burned during the same time period as those from the project, adding to the smoke that is produced and visible. However, as with the proposed project, this cumulative effect would likely only last 2-3 days at a time while piles are burning.

7.13 Social/Economic Conditions:

7.13.1 Affected Environment:

Shoshone County, established in 1864, encompasses 2633.91 square miles with a population density of 5.2 people per square mile. According to the 2000 census data, the county had a population of 13,771; 5,906 households and 3,856 families residing in the county. In the last three decades of the 1900s its population declined by 30.2 percent. Industries providing employment include: Education, health and social services (20.8%); Agriculture, forestry, fishing and hunting, and mining (13.0%); and Arts, entertainment, recreation, accommodation and food services (12.3%). The median household income was $28,535, and the median income for a family was $35,694. About 12.4% of families and 16.4% of the population were below the poverty line, including 21.8% of those under age 18 and 10% of those over 65.

According to the Idaho Department of Labor, in December 2008, Shoshone County was one of six Idaho counties with a double-digit unemployment rate. While Shoshone County has had historically high unemployment rates, the 13.3% rate was higher than the past several years. Shoshone County's unemployment rate changes quickly due to the relatively low population and fluctuates due to cyclical industries such as agriculture, forestry and mining; typically with less people employed during the winter months.

BLM, USFS and private lands in the area provide a source of economic benefit to the Silver Valley area from the recreational and commercial opportunities. Public land, adjacent to private property, is sometimes viewed as being an asset because public lands cannot be commercially developed; providing landowners with a landscape that is unobstructed by other residential or commercial sites. Landowners place a high value on the visual benefits derived from open space and native vegetation.

The OHV trails surrounding Pinehhurst attract numerous motorized recreationists to the area who eat and sleep in the local area. Annual OHV jamborees attract several hundred visitors to the area for these three to four day events. Dispersed recreationists, including hunters or berry pickers add to the local economy and supplement the traditional industries of mining and logging.

Surrounding the project area there are about 20 private residences located along Pinecreek and the East Fork of Pine creek. Adjacent to the project area is also private timber and mining company land (See Map 3: Lynch Gulch – Access)

7.13.2 Environmental Effects from Alternative A (Proposed Action):

The economic discussion below shows the estimated “real” dollars that would be derived from the project areas. While the number of times that a dollar is cycled through the community is not projected, each dollar winds up benefitting several people and/or businesses as it is used to cover wages, supplies, operating expenses, living expenses, etc.

The project would contribute to the local economy by providing jobs needed to accomplish the work described in the Proposed Action and by providing forest products to local sawmills and other manufacturers ranging from Shoshone County south to Benewah County and west to Kootenai County (depending on who purchases the various forest products derived from the project area).

The various forest products that would result from implementing the Proposed Action range from saw logs, studs from hew wood, hog fuel for cogeneration plants, pulp, chips for strand board, posts, poles, biomass and firewood. Due to the volatility of the wood product market, an accurate estimate of the type of forest products, quantity of forest products and the value of these products cannot be made. However, saw logs and hew wood quantities can be estimated as these are the most common forest products to arrive at an estimated forest product value. This estimated value would reflect the potential minimum value of forest products which would be removed from the project area based on the criteria in the proposed action.

Using April 2015 average delivered log prices for saw logs and hew wood, it is estimated that the value of saw logs and hew wood removed from the sale area would be approximately $1,000,000.00. Delivered log price is the amount a mill pays for loggers and/or land owners for wood delivered to the mill. Most often the basis for payment is either board feet or tons. No estimate of quantity is being made of other forest products that would be removed from the project area. However, any other forest products removed from the project area, such as biomass, would provide additional economic support to the local community. It is difficult to arrive at a total value for all forest products and to estimate how much more economic value is poured into the local

economy from these manufacturers. For purposes of this discussion, it was assumed that two-thirds of the final product value covers the cost of getting it to the manufacturer (in this case delivered log price). Based on the above discussion, the sale of forest products would add another $50,000 to $75,000 to the local economy.

7.13.3 Environmental Effects from Alternative B (No Action):

The No Action Alternative, by foregoing implementation of timber harvest and the development and restoration package would result in no change to the current revenue production or expenditures. The proposed timber volume in the project would be part of the BLM's allowable sale quantity of 46.9 million board feet per 15 year planning period. If the sale is not offered, the BLM's planned volume for the year in which the sale was to occur may decline, affecting local and regional economies. Changes in harvest levels translate into changes in timber industry employment and income levels.

7.13.4 Cumulative Effects:

It is difficult to quantify monetary benefits from the private, State, BLM and USFS managed lands in the cumulative effect area due to volatility of delivered log prices. The proposed project is expected to bolster the economy of the area by providing additional raw material to manufacturers, creating or increasing jobs. Increased supply of raw material would help hold down prices for finished products.

7.14 Recreation

7.14.1 Affected Environment:

The project area is within the Rochat Divide/ Pine Creek (backcountry motorized zone) Special Recreation Management Area (SRMA). This SRMA is characterized by motorized and trail-related activities for adventure, exploration, and social group or family affiliation within front and mid-country forest mountain settings (RC-1.5). Limited motorized vehicle use is allowed on 12.75 miles of designated routes for semi primitive motorized opportunities (RC-1.5.1). . Cross- country snowmobile travel is allowed on frozen and snow covered ground (TM-1.1.3) with seasonal restriction applying (RMP Map 4). The project area has no developed recreation opportunities.

Public use of the project area is often year around, with OHV use generally occurring in the months without deep snow cover. Spring through summer recreation includes activities such as berry picking, firewood gathering and hunting. Increased levels of winter recreation can occur depending on snow depth. Tracked machine use can be popular in the area when winter snow levels are adequate. Non-authorized motorized access to existing routes (routes not designated through the Travel Management Plan) is also prevalent in the area. The main recreational uses are OHV, hunting, and other dispersed non-motorized activities primarily by locals. In general, non-authorized use levels can be characterized as moderate due to the project's proximity to Pinehurst, Cataldo, Silver Valley, and Pine Creek.

7.14.2 Environmental Effects from Alternative A (Proposed Action):

The primary timber harvest period would occur during the summer and fall months. This is generally when public use within the project area is high. The general public who recreates in the area understands the local economic benefits that a timber sale can bring to the communities. Generally, the public encourages timber sale practices on public lands. Minor displacement to the public that engage in activities such as berry picking, hiking, wood gathering etc. could occur, but would be short term. The public would be restricted from using the project area during active logging and burning phases, which can lead to temporary displacement of some recreational activities. However, having only relatively moderate use within the project area, any restrictions of use would be minimal due to the abundance of available public access within the Pine Creek area.

Some of the existing routes used in the timber sale will be for administrative use only, while use of designated routes within the Coeur d'Alene RMP Travel Management Plan (TMP) for the area will be utilized as well (See Map 7 Recreation). TMP designated routes will remain accessible to the public during the proposed action implementation. As such, non-designated existing routes are closed to public motorized access per the TMP. The 2.9 miles of proposed closed/decommissioned roads are not generally used by the public due to their condition or they lead to a dead-end. The new road construction would provide better access for motorized use. The road would follow the contour of the landscape creating a more sustainable road. The public land near the Pine Creek area would be evaluated through the travel management planning process in the future to determine route designations. With the timber harvest, hunting in the area could increase with increased visibility.

7.14.3 Environmental Effects from Alternative B (No Action):

Under the no action alternative motorized use of the existing roads and trails would continue, as well as continued use of non-designated routes. The most popular public uses of the area, hunting, berry picking, etc. would continue uninterrupted. Hunting, which is the most popular activity of the project area, would decrease due to degraded forest conditions.

7.14.4 Cumulative Effects:

As described within the affected environment section, the surrounding landscape has seen significant disturbance from mining, timber harvest, and other human activities since the 1800s. Recreation activities occurring in the vicinity of the project area involve a broad spectrum of dispersed recreation ranging mostly from OHV users to hunters. With the timber harvest, hunting in the area could increase with increased visibility.

The mitigation measures and design features would minimize any cumulative impacts from the project as compared to other timber management practices observed in the surrounding area over the last several years.

Nearby private lands have undergone significant timber harvest and road construction during that time period, and have significantly changed the visual nature of the area.

8.0 Tribes, Individuals, Organizations, or Agencies Consulted

Shoshone County Commission
Coeur d'Alene Tribe
Idaho Department of Fish & Game
US Fish and Wildlife Service
Idaho Conservation League
Idaho State Historic Preservation Office
Idaho Native Plant Society

9.0 List of Preparers

Jered Bowman	Forester/Project Lead
Kristen Sanders	Fire Ecologist
Carrie Hugo	Wildlife Biologist
LeAnn Abell	Botanist
Mike Stevenson	Hydrologist
David Sisson	Archeologist
Cindy Weston	Fisheries Biologist
Janna Paronto	Realty Specialist
Doug Evans	Natural Resource Specialist/Weeds
Jake Bachtel	Park Ranger
Scott Pavey	Planning & Environmental Coordinator

10.0 References Cited

Adams, R.A. 2003. Bats of the Rocky Mountain West. University Press of Colorado. Boulder, CO. USA. 289pp.

Agee, J.K. 1993. Fire ecology of Pacific Northwest Forests. Island Press, Washington, D.C. 493pp.

Agee, J.K., Skinner, C.N., 2005. Basic principles of forest fuel reduction treatments. Forest Ecology and Management 211, 83–96.

Barrett, Stephen W. 1994. Fire Regimes on the Payette National Forest, Bear analysis Area. 18pp.

Benda, L., D. Miller, P. Bigelow and K. Andras. 2003. Effects of post-wildfire erosion on channel environments, Boise River, Idaho. Forest Ecology and Management 178: 105-119.

Bisson, P. A., B. E. Rieman, C. Luce, P. F. Hessburg, D. C. Lee, J. L. Kershner, G. H. Reeves and R. E. Gresswell. 2003. Fire and aquatic ecosystems of the western USA: current knowledge and key questions. Forest Ecology and Management 178: 213-229.

BLM. 2007. Coeur d'Alene Approved Resource Management Plan and Record of Decision. U. S. Department of the Interior, Bureau of Land Management, Coeur d'Alene, Idaho. http://www.blm.gov/id/st/en/prog/planning.html

BLM. 2007. Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report. BLM, Nevada State Office, Reno, Nevada.

Bock, C.E. and J.H. Bock. 1983. Responses of birds and deer mice to prescribed burning in ponderosa pine. The Journal of Wildlife Management, vol 47, no. 3, pp 836-840. Allen Press.

Chamberlain, T. W., R. D. Harr and F. H. Everest. 1991. Timber Harvesting, Silviculture, and Watershed Processes. *In* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19:181-205.

Cooper, S.V., Neiman, K.E., and D.W.Roberts. 1991. Forest habitat types of Northern Idaho: A second approximation. Gen.Tech.Rep INT-236. USDA Forest Service, Intermountain Research Station. Ogden, Utah.

Copeland, J.P., J.M. Peek, C.R. Groves, W.E. Melquist, K.S. McKelvey, G.W. McDaniel, C.D. Long, and C.E. Harris. 2007. Seasonal habitat associations of the wolverine in central Idaho. Journal of Wildlife Management, Volume 71, Issue 7, Pages 2201-2212.

Demars, Jr. C.J.and Roettgering, B.H. 1982. Western pine beetle. Forest Insect and Disease Leaflet 1. USDA Forest Service 7 p

Donato,M.M. 2006. Annual trace metal load estimates and flow –weighted concentrations of cadmium, lead and zinc in the Spokane River basin, 199-2004. U.S.G.S. Scientific Investigation Report 2006-5188, 38p.

Dunham, J. B., M. K. Young, R. E. Gresswell and B. E. Reiman. 2003. Effects of fire on fish populations: landscape perspectives on persistence of native fishes and nonnative fish invasions. Forest Ecology and Management 178: 183-196.

DuPont, J. and N. Horner. 2006. Coeur d'Alene River Snorkel Surveys. Idaho Department of Fish and Game, Panhandle Region

DuPont, J. and N. Horner. 2003. Regional fisheries management investigations, Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-28, Job c-2, 2003 Performance Report, Cutthroat Trout Trend Assessment. Boise, Idaho.

Ellis W.M, J.R. Taylor J, and R. J. Harrod. 1999. The reproductive biology and host specificity of *Orobanche pinorum* Geyer (Orobanchaceae). Madroño 46 (1): 7-12.

Everest, F. H., J. R. Sedell, N. B. Armantrout, T. E. Nickelson, S.M. Keller, J.M. Johnston, W. D. Parante, and G. N. Haugen. 1985. Chapter 10: Salmonids. In E.R. Brown ed. Management of Wildlife and Fish Habitats in Forests of Western Washington and Oregon. 1985. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, and U.S. Department of Interior, Bureau of Land Managemnent.

Fredricks, J. and R. Hardy. 2010. South Fork Coeur d'Alene River and Pine Creek Cutthroat Trout Study. Idaho Department of Fish and Game. Coeur d'Alene, Idaho.

Fulé, P.Z., McHugh, C., Heinlein, T.A., and W.W. Covington, W.W. 2001. Potential Fire Behavoir is Reduced Following Forest Restoration Treatments. USDA Forest Service Proceedings RMRS-P-22

Furniss, M.J., T.D. Roelofs, and C. S. Yee. 1991. Timber Harvesting, Silviculture, and Watershed Processes. *In* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19:297-323.

Graham,R. and T. Jain, 2005. Ponderosa pine ecosystems. USDA Forest Service Gen. Tech. Rep. PSW-GTR-198.

Graham, R.T., S. McCaffrey, and T.B. Jain. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. USDA Forest Service General Technical Report RMRS-GTR-120.

Gresswell, R. E. 1999. Fire and Aquatic Ecosystems in Forested Biomes of North America. Transactions of the American Fisheries Society 128: 193-221.

Hagle, S.K., Gibson, K.E., and Tunnock, S. 2003. Field guide to diseases and insect pests of northern and central Rocky Mountain conifers. Report No. R1-03-08. USDA Forest Service; State and Private Forestry; Northern Region, Missoula, Montana; Intermountain Region, Ogden, Utah. 197 p.

Hammet, E. A. 2008. Tumbledown Project—Threatened, Endangered, and Sensitive Plants and Forest Species of Concern (Rare Plants) Report. USDA Forest Service, unpublished report on file at Sandpoint Ranger District Office.

Harrod, R. J., D. E. Knecht, E. E. Kuhlmann, M. W. Ellis, and R. Davenport. 1997. Effects of the Rat and Hatchery Creek fires on four rare plant species, in Greenlee, J. M., Proceedings: First Conference on Fire Effects on Rare and Endangered Species and Habitats. Coeur d'Alene, Idaho. International Association of Wildland Fire, Fairfield, WA. p. 311-319.

Harvey, A. E., Byler, J. W., McDonald, G. I., Neuenschwander, L. F., and Tonn, J. R. 2008. Death of an ecosystem: perspectives on western white pine ecosystems of North America at the end of the twentieth century. Gen. Tech. Rep. RMRS-GTR 208. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Hood, S., Bentz, B., Gibson, K., Ryan, K., and Denitto, G. 2007. Assessing post-fire Douglas-fir mortality and Douglas-fir beetle attacks in the northern Rocky Mountains. Gen. Tech. Rep. RMRS-GTR-199. Fort Collins, Colorado: USDA Forest Service, Rocky Mountain Research Station.

Hooker, L. L. and E. W Tisdale. 1974. Effects of prescribed burning on a seral brush community in northern Idaho. University of Idaho. Forest, Wildlife, and Range Experiment Station. Paper no. 14. Moscow, ID.

Hornocker, M.G. and H.S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Canadian Journal of Zoology, Volume 59, Pages 1286-1301.

Idaho Conservation Data Center. 2010. Elements of occurrence database. Idaho Department of Fish and Game, Boise, Idaho.

IDFG. 2003. Wolverine Survey Project Report December 2002-April 2003. Idaho Department of fish and Game Region 1.

Idaho Department of Fish and Game. 2005. Idaho Comprehensive Wildlife Conservation Strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm

IDFG. 2014. Idaho Fish and Game Elk Management Plan. Accesses as: https://fishandgame.idaho.gov/public/wildlife/planElk.pdf; December 2015

Idaho Department of Lands. 2015. Annosus root disease information pamphlet. Accessed as: http://www.idl.idaho.gov/forestry/forester-forums/id8.pdf; December 2015.

Innes, Robin J. 2011. Cervus elaphus. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2014, June 3].

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Kaufman, Kenneth. 1996. Lives of North American Birds. Houghton Mifflin. New York, NY. 675pp.

LANDFIRE: LANDFIRE 1.1.0 LANDFIRE.US_130FBFM40. U.S. Department of the Interior, Geological Survey. [Online]. Available: http://landfire.cr.usgs.gov/viewer/ [2012].

Lichthardt, J. 2003. Conservation Strategy for Clustered lady's-Slipper Orchid (*Cypripedium fasciculatum*) in U.S. Forest Service Region 1. Idaho Department of Fish and Game. Boise, Idaho. June 2003. 25 p. plus appendices.

Lemoine, M., M. K. Young, K. S. McKelvey, L. Eby, K.L. Pilgrim, M.K. Schwartz. 2014. Cottus Schitsuumsh, a new species of sculpin (Scorpaeniformes: Cottindae) in the Coulumbia River Basin, Idaho-Montana, USA. Zootaxa. 3755(3): 241-258.

Lorain, C.C. 1991. Species management guide for Mimulus clivicola (bank monkeyflower) on the Clearwater and Nez Perce National Forests. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 16 p. plus appendices.

Mace, R. D., J. S. Waller, T. L. Manley, L. J. Lyon and H. Zuuring. 1996. Relationships among grizzly bears, roads and habitat in the Swan Mountains, Montana. Journal of Applied Ecology 33: 1395-1404.

May, C.L. and R. E Gresswell. 2003. Large wood recruitment and redistribution in headwater streams in the southern Oregon Coast Ranges, U.S.A. Can. J. For. Res. 33(8): 1352-1362.

McLellan, B. N. and D. M. Shackleton. 1988. Grizzly bears and resource-extraction industries: Effects of roads on behavior, habitat use and demography. Journal of Applied Ecology 25: 451-460.

Megahan, Walter F. and John G. King. 2004. Erosion, Sedimentation, and Cumulative Effects in the Northern Rocky Mountains. Pages 201-222 in George G. Ice and John D. Stednick editors. A Century of Forest and Wildland Watershed Lessons. Society of American Foresters, Bethesda, Maryland.

Meredith, C., B. Roper and E. Archer. 2014. Reductions in Instream Wood in Streams near Roads in the Interior Columbia River Basin. North American Journal of Fisheries Management, 34:3, 498-506.

Mitchell, R.G., Waring, R.H. and G.B. Pitman. 1983. Thinning lodgepole pine increases tree vigor and resistance to mountain pine beetle. For. Sci. 29:204-211.

Mink, L.L., R.E. Williams, and A.T. Wallace. 1971. Effects of industrial and domestic effluents on the Coeur d'Alene River basin. Idaho Bureau of Mines and Geology. Pahphlet 140. Moscow, Idaho.

Montana Fish, Wildlife, and Parks. Montana Animal Field Guide [Internet]. Available from: http://fwp.mt.gov/fieldguide/.

Moser, B.W. 2007. Space use and ecology of goshawks in northern Idaho. Dissertation, University of Idaho, Moscow, USA.

Murphy, M. L. and K. V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. N. Am. J. Fish. Manage. 9: 427-436.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at:http://explorer.natureserve.org. (Accessed: January 15, 2016

Peek,J. M., M. D. Scott, L.J. Nelson, D.J. Pierce,and L. L. Irwin. 1982. Role of cover in habitat management for big game in northwestern United States. Transactions of the North American Nature Resource Conference 47:363-373.

Peterson, J.L. 2001 Regulations for Smoke Management. Pages 61 – 74 in *Smoke Management Guide for Prescribed and Wildland Fire, 2001 Edition*. C.C. Hardy, R.D. Ottmar, J.L. Peterson, J.E. Core, and P. Seamon, eds. National Wildfire Coordination Group, PMS-420-2.

Quigley, T. M., and S. J. Arbelbide, technical editors. 1997. An assessment of ecosystem components in the interior Columbia Basin. USDA Forest Service. Volumes I-V. Pacific Northwest Research Station. General Technical Report PNW-GTR-382. 303pp.

Raymond, Crystal L. and David L. Peterson, 2005. Fuel treatments alter the effects of wildfire in a mixed-evergreen forest, Oregon, USA. Can. J. For. Res. 35: 2981–2995.

Reinhardt, E.D., R.E. Keane, and J.K. Brown. 1997 First Order Fire Effects Model: FOFEM 4.0 User's Guide. USDA Forest Service, Intermountain Research Station Gen. Tech. Rep. INT-GTR-344. 65pp.

Reinhardt, E. 2003. Using FOFEM 5.0 to estimate tree mortality, fuel consumption, smoke production, and soil heating from wildland fire. USDA Forest Service, Missoula Fire Sciences Lab, Missoula, MT. 6pp.

Reinhardt, E.D., R. E. Keane, D.E. Calkin, J.D. Cohen, 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. Forest Ecol. Manage. 256:1997-2006.

Rieman, B. E., D. Lee, D. Burns, R. Gresswell, M. Young, R. Stowell, J. Rinne and P. Howell. 2003. Status of native fishes in the western United States and issues for fire and fuels management. Forest Ecology and Management 178: 197-211.

Rippy, R.C., Stewart, J.E., Zambino, P.J., Klopfenstein, N.B., Tirocke, J.M., Kim, M., Thies, W.G. 2005. Root diseases in coniferous forests of the Inland West: potential implications of fuels treatments. Gen. Tech. Rep. RMRS-GTR-141. Fort Collins, Colorado: USDA Forest Service, Rocky Mountain Research Station.

Rodewald, P. (Editor). 2015. The Birds of North America Online: http://bna.birds.cornell.edu/BNA/. Cornell Laboratory of Ornithology, Ithaca, NY.

Rost, G. R. and J. A. Bailey. 1979. Distribution of mule deer and elk in relation to roads. Journal of Wildlife Management 43: 634-641.

Ruggiero, L.F., K.S. McKelvey, K.A. Aubry, J.P. Copeland, D.H. Pletscher, and M.G. Hornocker. 2007. Wolverine conservation and management. Journal of Wildlife Management, Volume 71, Issue 7, Pages 2145-2146.

Sandberg, D.V., R.D. Ottmar, J.L. Peterson, and J. Core. 2002. Wildland Fire in Ecosystems: Effects of Fire on Air. Gen. Tech. Rep. RMRS-GTR-42 vol. 5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountaina Research Station. 79p.

Schwartz, C.C., S.D. Miller, and M.A. Haroldson. 2003. Grizzly bear. Pages 556-586 in G.A. Feldhamer, B.C Thompson, and J.A. Chapman, editors. Wild Mammals fo North America: Biology, Management, and Conservation. Second Edition. Johns Hopkins University Press. Baltimore, Maryland. USA.

Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Servheen, G., and J.L. Lyon. 1989. Habitat Use by Woodland Caribou in the Selkirk Mountains. Journal of Wildlife Management 53:230–237.

Skovlin, J. M, P. Zager, and B. K. Johnson. 2002. Elk habitat selection and evaluation. In North American elk: Ecology and management, eds. D. E. Toweill, and J. W. Thomas, 531–55. Washington, DC: Smithsonian Institution Press.

Smith, J.K. and W.C. Fischer. 1997. Fire ecology of the forest habitat types of Northern Idaho. Gen. Tech. Report INT-GTR-363. USDA Forest Service, Intermountain Research Station, Ogden, Utah.

Smith, R.L. 1992. Elements of Ecology. Third Edition. Harpers Collins Publishers Inc.

Thomas, J.W. 1979. Wildlife habitats in managed forests in the Blue Mountains of Oregon and Washington. USDA, Forest Service, Agriculture Handbook No. 553. 512 pp.

U. S. Environmental Protection Agency (EPA). August 2012 (2012b). Interim Record of Decision (ROD) Amendment, Upper Basin of the Coeur d'Alene River, Bunker Hill Mining and Metallurgical Complex Superfund Site.

U. S. Environmental Protection Agency (EPA). October, 2012 .Bunker Hill Mining and Metallurgical Complex Superfund Site Superfund Cleanup Implementation Plan,2012-2022.

USDA Natural Resources Conservation Service (NRCS). 2002. Soil Survey of St. Joe Area, Parts of Benewah and Shoshone Counties, Idaho.

Snyder, S. A. 1991. *Ursus americanus*. http://www.fs.fed.us/database/feis/animals/mammal/uram/index.html

Steidl, R.J., Powell, B.F., 2006. Assessing the effects of human activities on wildlife. George Wright Forum 23, 50e58

Stephens, S.L. and M.A. Finney. 2002. Prescribed fire mortality of Sierra Nevada mixed conifer tree species: effects of crown damage and forest floor combustion. Forest Ecology and Management 162 (2002) 261–271.

Stephens, Scott L. and Jason J. Moghaddas. 2005. Experimental fuel treatment impacts on forest structure, potential fire behavior, and predicted tree mortality in a California mixed conifer forest. Forest Ecology and Management 215 (2005) 21–36.

Thomas, J.W.; Black, H., Jr.; Scherzinger, R.J.; Pedersen, R.J. 1979. Deer and elk. In: Thomas,

J.W., ed. Wildlife habitats in managed forests-the Blue Mountains of Oregon and Washington. Agric. Handb. 553. Washington, DC: U.S. Department of Agriculture: 104-127.

USDA Forest Service. 2006. Placer Resource Area Environmental Assessment Specialist's Report on Threatened, Endangered and Sensitive Plants in the Placer Resource Area. USDA Forest Service, Idaho Panhandle National Forests, Coeur d'Alene River Ranger District.

U.S. Fish and Wildlife Service. 2007. Recovery Plan for *Silene spaldingii* (Spalding's Catchfly). U.S. Fish and Wildlife Service, Portland, Oregon. xiii + 187 pages.

USDA Forest Service. 2009. Fire effects information system. Available from: http://www.fs.fed.us/database/feis (accessed February 2011).

USDA Forest Service. 2015. Fire effects information system. Available: http://www.feis-crs.org/beta/faces/index.xhtml;jsessionid=58EE5EB33003F1A4AB9CE400CFA15B98 (accessed December 2015).

USID, Fish and Wildlife Service (USFWS). 1993. Grizzly Bear Recovery Plan. U.S. Fish and Wildlife Service, Missoula, Montana.

USFWS. 2008. 12-month finding on a petition to list the North American wolverine as endangered or threatened. Federal Register, March 11, 2008, Volume 73, Number 48, Pages 12929-12941.

USFWS 2012a. Designation of Critical Habitat for the Southern Selkirk Mountains Population of Woodland Caribou (*Rangifer tarandus caribou*): Proposed rule; availability of supplementary documents and announcement of public hearing. Federal Register 77(105):32075–32080.

USFWS 2012b. Regional Fact Sheets: Wolverine. http://www.fws.gov/mountain-prairie/factsheets/Wolverine-122010.pdf. Accessed August 2012.

Van Dyke, F. G., R. H. Brocke and H. G. Shaw. 1986. Use of road track counts as indices of mountain lion presence. Journal of Wildlife Management 50: 102-109.

Van Mantgem, Phillip and Mark Schwartz. 2003. An experimental demonstration of stem damage as a predictor of fire-caused mortality for ponderosa pine. Canadian Journal of Forest Restoration 34: 1343–1347.

Wondzell, S. M. and J. G. King. 2003. Postfire erosional processes in the Pacific Northwest and Rocky Mountain regions. Forest Ecology and Management 178: 75-87.

Wright, C.S., C.S. Balog and J.W. Kelly. 2010. Estimating volume, biomass, and potential emissions of hand-piled fuels. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 23 p.

Zack, A.C. & Morgan, P. (1994). Fire history on the Idaho Panhandle National Forests. Unpublished report, on file with the Idaho Panhandle National Forests, 3815 Schreiber Way, Coeur d'Alene, ID, 83815. 44 p.

11.0 Attachments

1) Map 1: Lynch Gulch – Project Area
2) Map 2: Lynch Gulch – Treatment Areas
3) Map 3: Lynch Gulch - Access
4) Map 4: Lynch Gulch - Harvest Methods
5) Map 5: Lynch Gulch – Forest Cover Types
6) Map 6: Lynch Gulch – Fire Behavior Models
7) Map 7: Lynch Gulch – Recreation
8) Map 8: Lynch Gulch – Road Decommissioning