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Forest
Service

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# Environmental Assessment

## Wrenco Project

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**Bonner County, Idaho**

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**See the inserted Map Packet for the list of figures associated with this document.** If your document does not have a map packet, please contact the Sandpoint Ranger District at (208)263-5111.

# CHAPTER 1✧ Purpose and Need

## Area Location

The Wrenco Loop Project is located within Bonner County, Idaho, approximately 12 air miles west of Sandpoint, Idaho. The project area consists of National Forest lands in the headwaters of Johnson Creek approximately nine miles west of Sandpoint (figure 1-1, map packet). The area can be reached by County Roads W93B and W97 via US Highway 2. The project area consists of approximately 1,470 acres of low elevation, National Forest land surrounded by Riley Creek Timber Company land, State of Idaho land, and private land in the Wrenco Heights subdivision, along the Wrenco Loop and Helen Thompson Roads. Watershed drainages present within the project area are an un-named creek, Johnson Creek and the West Fork of Johnson Creek. Each discharges into the Pend Oreille River. The project area has eastern and southern aspects. Elevations range from about 2,400 feet to 3,300 feet. The project area includes all or portions of sections 19, 30, and 31, in Township 57 North, Range 3 West, Boise Meridian.

## Background

The Wrenco Loop project was initially proposed in 1994. A letter proposing the project was mailed to the public in November of 1995, and an update letter was mailed in December of 1996. In 1999, other work priorities deferred the Wrenco Loop project. In 2002, the Sandpoint District returned to working on the project. The initial proposal was modified and another letter soliciting public comments was mailed out in November of that year. See the section on Public Involvement in Chapter 2 for more detailed information on the public involvement process.

In compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations, this environmental assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. It also provides the supporting information for a determination to prepare either an environmental impact statement or a finding of no significant impact (FONSI).

## Conditions that Determined the Need for the Project

### *Existing Condition*

The vegetation patterns in the project area are influenced by many factors including climate, topography, wildfires, and human activities. The changes we see from the early 1900s to today are primarily attributed to human-related factors: activities associated with timber harvest and wildfire suppression.

The forest stands found in the Wrenco Loop project area are dramatically different from those found in the early 1900s. The analysis area for vegetation was in private ownership until 1926. The area was severely burned sometime in 1926. This fire was severe enough to destroy most of the tree cover, as evidenced by the current age, structure, and tree heights of the stands. Currently, most trees are 60 to 110 feet tall and are generally in the 80+-year age range.

Following the 1926 fire, the area was transferred to Bonner County and then in 1946, to Federal ownership. The Forest Service carried out salvage and overstory removal harvests in 1947, 1953,

and 1965. These cuttings are assumed to have removed most of the larger diameter trees that survived the 1926 fire. During the times these large diameter trees were removed, Douglas-fir trees began occupying the logged areas. Today, a person walking through the project area would rarely see any large diameter ponderosa pine, western larch, or western white pine that historically occupied the area. However, a few scattered individuals and patches of large diameter trees remain.

With the increased number of shade-tolerant species such as Douglas-fir, the remaining few large trees (ponderosa pine, western larch, western white pine) are experiencing high competition levels for water, light, and nutrients. Shade-tolerant trees are crowding out these large trees, and the project area is essentially converting from a predominantly ponderosa pine and western white pine forest to a shade-tolerant forest. This competition will also lead to increased mortality in the Douglas-fir trees. As these trees die, they will begin to increase both the standing and down fuel available for a large-scale wildfire. Additionally, these dense stands of trees have created, and will continue to create, extensive fuel ladders (ability to carry a ground fire up into the tree crowns). With this increased fuel load and fuel ladder condition, there is the potential for an uncontrolled wildfire to spread from National Forest ownership onto private lands next to the project area.

Aside from the 1926 wildfire, the project area has experienced relatively few wildfire events in the past 70+ years. Prior to fire suppression, moderate-intensity ground fires decreased the probability of stand-replacing wildfires. These wildfires were frequent in occurrence and can be considered an important disturbance factor in the project area that maintained the large diameter trees described above. During the era of fire suppression, when wildfires did start, they were not allowed to burn throughout the project area. Young Douglas-fir trees that would have been killed by these low-intensity wildfires (because of their thin bark) have been growing unchecked. Thus, more Douglas-fir trees exist within the project area today than there were in the early 1900s. The greater probability of a stand-replacing fire today poses a risk to the adjacent developed private lands.

Past road construction to access timber in the project area included a road within a riparian area and log structures (bridge, culverts) that were left in place. Over time, these structures have deteriorated and currently pose a potential sediment risk to the West Fork of Johnson Creek.

## *Desired Landscape Change*

The "desired landscape change" is a conceptual picture of what a future forest in the project area would look like, and the types of ecological processes that would occur there. The Wrenco project area is part of this larger landscape. The Forest Service’s Interdisciplinary (ID) Team derived the desired landscape change based on ecological research that revealed the historic vegetation structure, pattern, and composition, as well as the disturbance factors that existed previously, as described above.

In the desired landscape, tree species composition and stand structures would move toward the vegetation patterns believed to be present in the early 1900s. Fire would be used as a tool to reduce the risk of uncontrolled fire and to maintain desired species composition. Wildfires would typically be of low intensity, and their threat to the surrounding private lands would be reduced. On dry sites, tree species that require more sunlight, such as ponderosa pine and western larch, would dominate. On more moist sites, the tree composition would be similar to the historic pattern with western white pine, western larch, and Douglas-fir as the dominant species. Within

these moist sites, western redcedar would occur in either small pockets or as an understory component to the species mentioned above.

Across the landscape, a mosaic or patch-like vegetation pattern of various age classes and size classes would develop. The dry-site mosaic would consist of an open canopy with a lot of sunlight reaching the forest floor. Large old ponderosa pine, Douglas-fir, and western larch would dominate the tree canopy, and young seedlings, saplings, and pole-sized trees would be growing in groups in open spaces within these stands. The moist-site mosaic would have a higher level of canopy closure and be more even-aged with a variety of tree species capable of occupying these habitats. Western white pine, western larch, western redcedar, and Douglas-fir would dominate the moist-site areas with some patches of cedar and other species present. The ladder fuels would be low and the crowns would be high in these stands with little to no lower branching. These moist-site stands would typically have more trees per acre than the dry sites.

As the vegetation moves towards the desired species composition, structure, and disturbance patterns, animals adapted to these conditions would return to these habitats or increase their use of available habitat. Overall species richness would increase in response to increases in the degree of interspersion (the mixing of plant communities and successional stages). Thus, the area would provide for a wider variety of wildlife species.

The diversity and amounts of forbs, shrubs, and grasses would increase as fire returns to portions of the project area. Collectively, the increases in types and amounts of forbs, grasses, and shrubs would enhance foraging opportunities for big game and other wildlife species.

Insect and disease occurrence would be at low levels, infecting mostly weakened or stressed trees of all sizes. As these trees die and turn into snags, a sustainable level of nesting/denning and feeding habitat for birds and small mammals would be maintained.

Fish habitat and water quality in Johnson Creek and West Fork Johnson Creek would provide high quality water resources to protect fish habitat, water based recreation, public water supplies, and be within state water quality standards. Known sediment sources would be removed.

# Purpose and Need

The purpose and need for the Wrenco Loop project were derived from the scientific assessments described in the section titled ***Error! Reference source not found.***, from field reviews and surveys of the resources in the Johnson Creek drainage, and from Forest Plan goals and objectives. Based on this information, the following is the purpose of this project:

**Restore desired forest cover, structure, pattern, and species composition across the landscape where they are outside natural or historic ranges by:**

- Changing forest composition (species mix) to emphasize long-term dominance of shade-intolerant species, such as ponderosa pine, western larch, and western white pine.
- Beginning to move the forest towards a structure (size/age class distributions) that approximates those structures found under low- and mixed-intensity fire regimes.

**Provide wildlife habitat diversity by:**

- Beginning to move the forest towards a composition and structure that favors the long-term persistence and stability of wildlife habitat diversity associated with low- and mixed-intensity fire regimes.

- Improving habitat for specific target species such as: flammulated owls, goshawks, pileated woodpeckers, and white-tailed deer.

**Create a forest structure and fuel conditions that would aid in suppression of wildfire adjacent to private land by:**

- Reducing the amount of ground and ladder fuels.

**Reduce potential sediment loading to streams from past road construction by:**

- Decommissioning portions of Forest road 1023 along West Fork of Johnson Creek and removal of the failing bridge and two stream crossings on West Fork Johnson Creek.

## Restore Forest Composition, Structure, Pattern, and Species Composition

A change in forest composition is needed to maintain white pine and the shade-intolerant species (ponderosa pine, and larch) as the dominant tree species. Favoring long-term dominance of these seral species will also contribute to the agency's goal of increasing the amount of this forest type at the landscape scale (Quigley and Arbelbide 1997 and USDA Forest Service unpublished report). Historically, these shade-intolerant species dominated forest cover types and made up about 55 percent of the Pend Oreille subbasin (USDA Forest Service unpublished report). Today these types comprise only 8 percent of the same area.

The need to change forest composition and structure is tied to the Forest Service's objective of maintaining ecosystems with "high ecological integrity. Ecological integrity for vegetation is defined as having a species composition, diversity, and functional organization expected from natural habitats of the region and they are resilient to environmental change and disturbance occurring within their natural range of variability" (USDA Forest Service unpublished report). Trending toward this objective would promote stands and forest landscapes that are more resilient to droughts that periodically occur in this ecosystem. This would reduce the risk of insect and disease outbreaks and large, severe wildfires.

Stands found in areas with low- and mixed-intensity fire regimes usually had fewer trees per acre, especially in the understory, and much larger trees than the forest stands that dominate the landscape today. These more open, mature structures have declined in the subbasin and have been replaced by dense stands of immature/medium size Douglas-fir (USDA Forest Service unpublished report). These stands currently dominate the project area.

## Provide Wildlife Habitat Diversity

Moving toward a forest composition and structure more like those found under low- and mixed-intensity fire regimes would favor those wildlife species associated with drier types of forest habitat. This dry habitat is currently well below levels believed to have occurred historically in the Pend Oreille subbasin (USDA Forest Service unpublished report). Reductions in the dry habitat component have in turn resulted in reductions of wildlife species associated with this type. These include flammulated owl, and pileated woodpecker. Restoring stands that are currently dominated by lower stocking of seral species would increase diversity of habitat and associated species over current conditions.

## Move Toward Conditions That Aid Wildfire Suppression Adjacent to Private Land

Creating a forest composition and structure similar to those found under low- and mixed-intensity fire regimes, along with slash disposal and underburning would help improve the ability to suppress wildfires adjacent to adjoining private lands.

### Reduce Risks of Potential Sediment Sources from Existing Roads

There are three known sites in the project area with the potential to contribute sediment to the West Fork of Johnson Creek. These sites are two log culverts and one log bridge on the old road paralleling the creek (Road 1023). Removing these structures and decommissioning this road would reduce the long-term risk of having undesirable levels of sediment delivered to the stream channel.

## *Overview of Scientific Findings from Broad Scale to Site Specific*

To arrive at our purpose and need for the project, the ID Team used information from a number of scientific assessments. Starting at the broad scale of the Columbia River Basin, the team derived general information about characteristics of the ecosystem in the basin. From there, the team "stepped down" their analysis to more specific levels of information - from the river basin level, to a subbasin level, to a landscape area level, to a watershed area level, and finally to a project area level. General information from these assessments and how they relate to the Wrenco Loop project area are briefly described below.

### Interior Columbia Basin Ecosystem Management Project (ICBEMP)

The ICBEMP Scientific Assessment (Quigley and Arbelbide 1997) evaluates all National Forest and BLM-administered lands in a 63 million-acre area within eastern Oregon, eastern Washington, all of Idaho, and western Montana. According to the assessment, the Wrenco Loop project area is located in Forest Cluster 4 (heavily roaded, moist forest types with moderate to high hydrologic integrity and low forest, aquatic, and composite integrity). The ICBEMP assessment findings show that the primary risks to ecological integrity in Forest Cluster 4 are:

- Risks to late and old forest structures in managed areas,
- Forest compositions susceptible to insects, disease and fire,
- Risks to hydrologic and aquatic systems from fire potential, and
- Declines in early and late stages of forest development.

In the assessment, the level below the Columbia River Basin scale was defined as "subbasin." The Wrenco Loop project is located in the Pend Oreille Lake subbasin, one of 164 subbasins in the Columbia River Basin.

### Northern Region Overview

The Northern Region Overview (USDA Forest Service 1998a) focused on priorities for restoring ecosystem health and availability of recreation opportunities. The overview considered and incorporates findings from the Interior Columbia River Basin Assessment. The Northern Region Overview Summary explores this Region's situation with regard to ecosystem health and recreation.

The Overview findings conclude that there are multiple areas of concern in the Northwest Zone of the Region (which includes the Idaho Panhandle National Forests), but that "*this subregion holds the greatest opportunity for vegetation treatments and restoration with timber sales…Aquatic restoration should be focused on specific needs based on the zone aquatic restoration strategy*" (Northern Region Overview Summary, USDA Forest Service 1998a, p. 9).

The Overview goes on to state, "*The timber management (timber harvest) tool best fits with the forest types in northern Idaho and is essential, for example, to achieve the openings needed to*

*restore white pine and larch, and maintain upland grass/shrub communities. It can enhance terrestrial/watershed objectives where timber funds are used to close and improve roads. Aquatic restoration could tie with assessing road access needs and obliteration of nonessential* [roads]" (Northern Region Overview Summary, USDA Forest Service 1998a, p. 33).

### Pend Oreille Geographic Assessment

The Idaho Panhandle National Forests (IPNF) has been assessing ecological conditions in the Pend Oreille Lake area, which includes the Pend Oreille Lake subbasin (USDA Forest Service unpublished report). The assessment has identified ecosystem trends and changes over the last 100 to 200 years. The Pend Oreille Geographic Assessment area is divided into Landscape Analysis Areas (LAAs). The Wrenco Loop Project is located in the "Purcell Trench LAA". Several Pend Oreille Geographic Assessment findings relate to the Wrenco Loop project area:

- There is a loss of long-lived tree species such as western larch, western white pine, and ponderosa pine, and an increase in Douglas-fir and grand fir.
- There is a lack of wildfire as a natural disturbance factor.
- There is an increased risk of severe stand-replacing fire on dry habitats due to fuel accumulations from the exclusion of fire.

### Wrenco Loop Project Area Information

In addition to the previously mentioned assessments, other documents were used to obtain information pertaining to the project area. The Lake Pend Oreille Bull Trout Watershed Advisory Group (1999) looked at the watersheds within the Lake Pend Oreille Basin and ranked them in order of restoration priority. Johnson Creek watershed was ranked as a low priority watershed for bull trout restoration, primarily because of the impacts private land activities have had on the watershed.

The Forest Service has been conducting field reconnaissance within the Wrenco Loop project area since 1993. Information obtained during this time has revealed that:

- There has been a reduction in long-lived tree species (white pine, larch and ponderosa pine) and old forest structure due to logging, fire suppression, white pine blister rust, and increases in species such as Douglas-fir and grand fir. These vegetation conditions have created a very homogeneous forest that lacks structural and tree species diversity. There is a direct correlation between this lack of vegetation diversity and a lack of wildlife habitat and species diversity.
- Lack of natural fires (from fire suppression) and an increase in dying trees has allowed forest fuels to increase. If left untreated these fuels could increase the risk of wildfire on private lands.
- There are three known sediment sources in the project area with the potential to contribute sediment to the West Fork of Johnson Creek.

## Proposed Action

The proposed action, which was derived from the purpose and need, serves as a starting point for the ID Team and gives the public and other agencies specific information on which to focus comments. Using these comments and information from preliminary analysis, the ID Team then develops alternatives to the proposal. These are discussed in detail in Chapter 2.

Proposed activities for the Wrenco Loop Project would include:

- Selective and regeneration cutting methods (see Chapter 2 for a description) followed by planting of desired long-lived species such as ponderosa pine, white pine, and larch.
- Modifications of forest composition and structure to include more shade-intolerant seral species such as ponderosa pine, white pine, and larch as the dominant tree species, which would favor those wildlife species associated with this type of forest habitat.
- Prescribed burning and mechanical fuel treatment to improve the ability to suppress wildfires adjacent to private lands.
- Remove three existing sediment sources to the West Fork of Johnson Creek.

More details of the proposed action can be found in Chapter 2, under Alternative A.

## Scope of the Analysis

The Wrenco Loop Environmental Assessment (EA) is a project-level analysis. The scope of the analysis is confined to addressing the significant issues and potential environmental consequences of project implementation. It does not attempt to address decisions made at higher levels, but rather to implement direction provided at those higher levels. The Wrenco Loop EA tiers to the Idaho Panhandle National Forests Forest Plan as recommended by 40 CFR1502.20.

In accordance with NEPA, it is the responsibility of the agency to assess direct and indirect environmental effects resulting from an agency action as well as the cumulative effects of all past, present and reasonably foreseeable actions. Connected actions associated with this project consist of noxious weed treatment and monitoring. Table 3-1 in Chapter 3 lists the past, present and reasonably foreseeable actions that are relevant to the Wrenco Loop project analysis. Each resource in Chapter 3 analyzes only those actions that fall within the cumulative effects analysis area described for that resource and that have the potential to affect the resource.

## Policy Direction and Legal Guidance

### *Forest Plan Direction*

The Forest Plan provides direction for all resource management programs and resource activities on the Idaho Panhandle National Forests. The Forest Plan consists of Forest-wide goals and standards as well as Management Area specific standards and guidelines that provide for land uses and resource outputs. The Forest Plan embodied the provisions of the National Forest Management Act (NFMA) of 1976 and its implementation regulations, as well as those of other guiding documents.

Forest Plan goals (p. II-1 & II-2 of the Forest Plan) that guided the development of the purpose and need are:

- Provide for a diversity of plant and animal communities.
- Maintain high quality water to protect fisheries habitat, water based recreation, public water supplies, and be within state water quality standards.
- Manage resource development to protect the integrity of the stream channel system.
- Provide efficient fire protection and fire use to help accomplish land management objectives.

- Manage the forest resources to protect against insect and disease damage.

Many Forest Plan standards are applicable to the general design of the proposed action. Specific Forest Plan standards (pp. II-32-34, II-38-39) that guided the development of the purpose and need are:

- Reforestation will normally feature seral tree species, with a mixture of species usually present. Silvicultural practices will promote stand structure and species mix that reduce susceptibility to insect and disease damage.
- Project design will provide for site preparation and slash hazard reduction practices that meet reforestation needs of the area.
- Maintain concentrations of total sediment or chemical constituents within State standards.
- Encourage utilization of Forest products to reduce biomass, which must be disposed of otherwise.
- Activity fuels will be treated to reduce their potential rate of spread and fire intensity so the planned initial attack organization can meet initial attack objectives.
- Vegetation management will favor the use of fire, hand treatment, natural control, or mechanical methods whenever feasible and cost effective. Direct control methods, such as chemical or mechanical, may be used when other methods are inadequate to achieve control.

The Idaho Panhandle National Forests Forest Plan designated Management Areas (MAs) to guide the management of National Forest lands within the Idaho Panhandle National Forests. Each MA provides for a combination of activities, practices, and uses appropriate to the management goals and objectives of that specific management area.

The Wrenco Loop project area is comprised of lands in two MAs (figure 1-2, map packet). Management areas are described in detail in the Idaho Panhandle National Forests Forest Plan on pages III-1 through III-87; summaries of the management area goals specific to the project area are as follows:

**Management Area 1** (approximately 308 acres within the project area) - Provide for long-term growth and production of commercially valuable wood products on those lands that are suitable for timber production.

**Management Area 4** (approximately 685 acres within the project area) - Provide winter forage to support existing and projected big game populations through scheduled timber harvest and permanent forage areas.

**Inland Native Fish Strategy (INFS) Riparian Habitat Conservation Areas** (RHCA) – The standards and guidelines under INFS provide the management direction for RHCAs. In 1995, this direction replaced previous Forest Plan direction for managing riparian areas using standards and guidelines described for Management Area 16.

## *Laws*

Shown below is a partial list of federal laws and executive orders pertaining to project-specific planning and environmental analysis on federal lands. While most pertain to all federal lands, some of the laws are specific to Idaho. References to these laws and orders, as well as disclosures and findings required by them, can be found throughout this document and the project file.

**Federal Laws**

- The National Environmental Policy Act of 1969 (as amended)
- The Clean Water Act of 1977 (as amended)
- The Clean Air Act of 1970 (as amended)
- The National Forests Management Act (NFMA) of 1976 (as amended)
- The Forest and Rangeland Renewable Resource Act (RPA) of 1974 (as amended)
- The Archaeological Resources Protection Act (1979)
- The National Historic Preservation Act (1966)
- Idaho Forest Practices Act (1974) and amendments
- Multiple Use Sustained-Yield Act of 1960
- Endangered Species Act (ESA) of 1973 (as amended)
- American Indian Religious Freedom Act of 1980

**Executive Orders**

- Executive Order 11593 (protection and enhancement of the cultural environment)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)

### *Final Rule – Administration of the Forest Development Transportation System*

In January 2001, the Forest Service Manual (FSM), which governs regulations concerning the management, use and maintenance of the National Forest Transportation (Road) System, (Chapter 7700) was revised with a "Final Rule." The Final Rule set forth that if a Forest level roads analysis has not been completed, the Responsible Official (in this case, the Sandpoint District Ranger) determines whether a roads analysis is needed at the project scale, and if so, what level of analysis is necessary to support a project-level decision. The Idaho Panhandle National Forest has not completed a forest-level roads analysis. In May of 2004, the Sandpoint District Ranger established direction for a roads analysis for the Wrenco Loop project (project file – roads section). See Chapter 3, Roads and Access Management for more information.

### *New National Programs and Policies Not Applicable to This Project*

**The National Fire Plan (NFP)** – Although the Wrenco Loop Project proposes fuel reduction activities and would meet some of the objectives outlined for hazardous fuel reduction in the NFP such as fuels reduction within the wildland urban interface, the project is not one of the priority projects identified in the NFP to receive special funding.

## Decisions to be Made

This EA is not a decision document. The EA discloses the environmental consequences of proceeding with the proposed action or any of the alternatives, and aids the deciding officer (Sandpoint District Ranger) in determining whether the effects disclosed would have a significant effect on the environment. If the deciding officer determines there would be no significant

effects, he will select an alternative and issue a Finding of No Significant Impact, and a Decision Notice. The final decision will be based on the information in this document, on public comments, financial considerations, and on how well the preferred alternative meets the purpose and need of the project and complies with applicable state and federal laws, agency policy and Forest Plan direction. Decisions to be made include whether to select an action alternative and, if so:

- When activities could begin and whether there are any time restrictions;
- What type of vegetation prescriptions would occur and where;
- Whether there is to be any road construction, road work or decommissioning and where;
- How roads in the project area would be managed;
- What type of fuels treatment would occur and where; and
- What mitigation and monitoring requirements would take place.

# CHAPTER 2✧ Alternatives

## Introduction

Alternatives to the proposed action were created after soliciting and receiving public comments on the proposal. The ID Team evaluated the issues raised in public comments and then developed alternatives based on these issues, Forest Service issues, and the purpose and need for the project. The next two sections describe the public involvement methods used and the issues that were raised. Details of the proposed action and the alternatives to it comprise the remainder of this chapter.

## Public Involvement

In November 1995, a proposal for the Wrenco Loop project (also known as a scoping letter) was mailed to the public for comment. In December 1996, an update letter was mailed informing people of the status of the project. Another scoping letter was sent in November 2002 when the project was modified and reinitiated. Comments received during both phases of scoping were used in alternative development and can be found in the project file - public involvement section. The project was also listed on the Idaho Panhandle National Forests Quarterly Schedule of Proposed Activities in November 2002 and has continued to be on the schedule ever since. Comments were received from 16 individuals, organizations, and agencies during the scoping phases. In December 2002, people who commented were contacted by phone or letter to discuss the issues raised in their response to the scoping letters.

## Issues

Issues raised during scoping by the public or from agencies were broken into three categories: key issues, analysis issues and issues eliminated from detailed analysis. Each category is discussed below.

### *Key Issues*

Key issues are those within the scope of the project that are of sufficient concern to result in the development of alternatives to the proposed action. There were no issues that resulted in irresolvable conflicts, other than opposition to the proposed action. Those comments are addressed by Alternative B – No Action (project file – scoping).

### *Analysis Issues*

Most comments received during scoping were related to the effects of the proposed action on various resources. Contents of the comments are sorted and summarized below. In addition, there were comments made on the potential cumulative effects of the project on various resources. Cumulative effects will be analyzed for each of the resources discussed below.

#### Effects on Forest Composition (Cover Type), Structure and Landscape Pattern

Changes in stand/forest composition, structure, and landscape pattern can affect forest health and other resource elements, such as fish and wildlife habitat.

**Measurement Criteria**: Percent change in cover type (existing dominant trees), percent change in structure, and changes in landscape pattern (measured by FRAGSTATS).

### Effects on Fire Suppression

There is concern that stand succession to a Douglas-fir dominated forest could result in fuel conditions that inhibit or prevent suppression of fires on National Forest System (NFS) lands, which could affect resource management objectives within the area and pose an increased threat to surrounding private land. Current conditions provide an opportunity to prevent an undesirable situation from occurring, rather than trying to treat stands once fuel loadings become too high.

**Measurement Criteria:** Projections of future stand conditions and fuel loadings, comparable conditions in vegetation types, prescribed burning and fire suppression in similar fuels and terrain. Fire spread rates and intensities will be estimated using BEHAVE Plus.

### Effects of Project Activities on Sensitive and Rare Plants

**Measurement Criteria:** Relative amount of canopy opening and/or ground disturbance in and adjacent to documented rare plant populations or suitable habitat.

### Effects on Noxious Weed Populations

There are some noxious weeds in the project area and along roads leading to the project area. Managers and the public are concerned about the risk of project activities on the spread of existing weed infestations and introduction of new weed invaders

**Measurement Criteria:** Relative amount of canopy removal and ground or understory vegetation disturbance.

### Effects on Wildlife Habitat

Potential changes in forest conditions may affect certain wildlife species. Of particular concern is big game, and threatened, endangered, and sensitive species.

**Measurement Criteria:** Effects on boreal toad will be measured by evaluating protection and quality of wetlands and terrestrial habitats. Effects on flammulated owls, pygmy nuthatch and fringed myotis will be measured by changes in habitat suitability (late forest structure and composition, and large snag habitat). Effects on northern goshawks will be measured by evaluating the changes in habitat suitability (late forest structure, and disturbance). Effects on black-backed woodpeckers will be measured by evaluating the quality and distribution of snag habitat. Effects on pileated woodpeckers will be measured by evaluating quality and abundance of large diameter trees and snags. Effects on marten will be measured by evaluating forest structure and abundance of downed woody material. Effects on white-tailed deer winter range will be measured by evaluating changes to critical winter range. Effects on forest land birds will be measured by evaluating forest health, stand structure, and habitat diversity.

### Effects on Soil Productivity

Soil productivity can be reduced by removal of organics and associated nutrients or by detrimental impacts such as compaction, displacement, rutting, surface erosion, puddling, or severe burning.

**Measurement Criteria:** Percent detrimental impact by activity area and disturbed soils, acres of potential loss of potassium and woody debris, activities on sensitive landtypes.

### Effects on Water Quality and Fish Habitat

Water quality and changes in channel characteristics can affect fish populations and/or habitat within the project area or downstream.

**Measurement Criteria:** Reduction in canopy cover, sediment yield (predicted by the Water Erosion Prediction Project – WEPP), and their effects on fish habitat.

### Effects on Air Quality

Underburning and pile burning have the potential to affect local and regional air quality.

**Measurement Criteria:** Emissions predicted with First Order Fire Effects Model (FOFEM), and whether or not air quality standards are met.

### Effects on Visual Quality

Managers and the public are concerned that proposed activities could adversely affect the visual quality of the area.

**Measurement Criteria:** Whether or not Forest Plan standards for visual quality are met.

### Project Feasibility

Managers and members of the public have expressed concern over the costs associated with the various activities being proposed, including timber sale viability.

**Measurement Criteria:** Predicted high bid calculated by the Region 1 timber sale Transactions Evidence Appraisal.

## *Issues Used For Project Design*

Design features were included in the proposed action when it was sent to the public during scoping. Suggestions or comments for additional design features were made by the public, which were included in the proposed action. Design features added in response to public comment include:

- Traffic control;
- Dust abatement;
- Road maintenance;
- Stream buffers;
- Protection of springs;
- Goshawk nest protection
- Noxious weed spread prevention;
- All-terrain vehicle (ATV) use and public access; and
- Water quality protection.

## *Issues Eliminated from Detailed Analysis*

The following issues that were raised in public comments have been eliminated from further analysis because they are either not relevant to the project or its resources, they are beyond the scope of the project, or they have been addressed by virtually eliminating any potential effects through project design.

**Effects to Domestic Water Supply** – There was concern by two landowners with surface water intakes that their domestic water supply would be contaminated. Stream crossings and fuel treatments are designed for minimal environmental impact. Stream crossing would be oversized and would remain within the road prism after roads are placed in storage. Every effort would be made to construct the northern-most streams crossing during the time that Johnson Creek runs dry. Fuel treatments potentially affecting water intake areas would be grapple piled rather than prescribed burned, which would reduce the ash and nutrient discharge into these systems. For these reasons, this issue was eliminated from further analysis.

**Loss of Control During Prescribed Burning** – Prescribed burning is conducted only when weather and moisture conditions are favorable for control, and when adequate resources of personnel and equipment are available. Implementing design features described in this Chapter to address this issue would be highly effective at keeping a prescribed fire under control. For these reasons, this issue was eliminated from further analysis.

**Effects of New Road Construction on Public Access** – There was concern from members of the public that building new forest roads would lead to private land trespass and increased off-highway vehicle (OHV) use. Design features in this chapter address this concern by prohibiting motor vehicle use on any newly constructed road (except for administrative use). In addition, either a locked gate or an earthen berm would close all newly constructed roads. These are highly effective methods of reducing vehicle use. For these reasons, this issue was eliminated from further analysis.

# Alternatives Considered in Detail

## *Proposed Action (Alternative A)*

This alternative is the proposed action and is designed to respond to the purpose and need identified in Chapter 1. Figures 2-1, 2-2, and 2-3 (see map packet) display the activities in this alternative. Details of actions proposed are described below.

A commercial timber sale would be used to meet the purpose and need. Trees would be removed from approximately 612 acres of National Forest land. Most stands would be thinned to remove poor-form class and diseased trees and to improve crown development and growth of desired trees. Regeneration cutting and reforestation would occur in a few stands with the intent of trending these stands towards desired species. Slash would be eliminated by grapple piling and burning, and prescribed burning. Prescribed underburning would also occur in forested areas to reduce undergrowth of tree species susceptible to fire (grand fir, Douglas-fir, and western hemlock). Specific treatments are as follows:

### Area I (Dry Sites - Approximately 270 Acres)

**Vegetation Treatment** – Treatment of vegetation within Area I would occur on about 270 acres (figure 2-3, map packet). The vegetation prescription would consist of thinning from below to retain an overall 40 to 65 percent crown closure. Trees removed would include those with poor form-class, insect attacks and disease, and undesired tree species. The remaining trees would be the largest, best form-class trees available; retention of ponderosa pine and western larch would be favored over other species.

Up to ten percent of the area could result in three- to five- acre openings where trees have been suppressed and consequently will not grow after thinning, or in areas where root rot, insects, or other disease problems pose a threat to stand health.

**Reforestation -** Ponderosa pine and western larch would be planted in openings created by cutting. White pine may also be planted where habitat is appropriate.

### Area II (Moist Sites - Approximately 260 Acres)

**Vegetation Treatment** – Treatment of vegetation within Area II would occur on about 260 acres (figure 2-3, map packet). The vegetation prescription would consist of thinning from below to achieve an overall 50 to 70 percent crown closure. Trees removed would include those with poor form class, insect attacks and disease, and undesired tree species. The remaining trees would be the largest, best form-class trees available favoring retention of white pine, western larch, and ponderosa pine. There would be scattered areas of leave-trees where no treatment would occur.

Up to ten percent of the area could result in three- to five-acre openings where trees have been suppressed and will not release from thinning, or in areas where root rot, insects, or other disease problems pose a threat to stand health.

**VEGETATION TREATMENT DEFINITIONS**

Regeneration Cutting and Reforestation: Most of the trees would be removed to provide growing space for planted or natural seedlings. Some live and dead trees would be retained in an irregular spacing for wildlife habitat, visual quality maintenance, shelter for seedlings, a seed source for natural regeneration, and woody debris for long-term site productivity. Generally, there would be less than 30 percent of the trees remaining. The resulting view would be an open stand with scattered standing trees and patches of trees. The size of regeneration cut units would be less than 40 acres. The areas would be reforested with western larch, ponderosa pine, and/or white pine within five years. Prescriptions to accomplish selective cutting could include irregular shelterwood or irregular seed tree.

**Selective Cutting:** Some trees would be removed in areas where there is the opportunity to maintain or enhance the growth of western larch or ponderosa pine, or move the stand towards desired structural stages. Trees removed would generally be smaller or less dominant, species not desired for future stand composition, or diseased or dead trees not needed to meet future stand objectives. Trees removed would provide growing space for the remaining trees. These stands would generally not be open enough to allow for successful establishment of desired tree species except where planted in three to five-acre openings throughout the stand. The number of trees remaining in these areas would vary, but stands would generally have the appearance of being thinned. Prescriptions to accomplish selective cutting could include thinning and improvement cutting.

**Reforestation -** White pine, western larch, and ponderosa pine would be planted in openings created by cutting and/or burning. Species planted will be based on the habitat types and microsite conditions present within each opening.

### Area III – (Regeneration Cutting and Reforestation – Approximately 82 Acres)

**Vegetation Treatment** – Treatment of vegetation within Area III would occur on about 82 acres. Regeneration cutting would occur in stands where there is high mortality, risk of high mortality, undesirable species composition, or where trees will not grow due to insufficient crowns. Many of these are stands where there is significant tree mortality occurring. Following cutting, these stands would be underburned or grapple piled and reforested with desired potentially longer-lived species.

**Reforestation** - White pine, western larch, and ponderosa pine would be planted in openings created by cutting and/or burning. Species planted will be based on the habitat types and microsite conditions present within each opening.

### Fuels Treatment in Area I, II, and III

Fuels would be treated in order to help improve the ability to suppress wildfires and to prepare the site for planting desired, longer-lived species of ponderosa pine, larch and white pine. To reduce the existing fuels and those created by the vegetation treatment, there would be about 471 acres of grapple piling and 141 acres of underburning (figure 2-1, map packet).

### Logging Systems

Vegetation harvest systems would include about 86 acres of skyline yarding, 240 acres of tractor yarding, and 285 acres of winter tractor (figure 2-2, map packet).

### Road Construction and Storage

To accomplish vegetation restoration activities there would be approximately 3.3 miles of road construction (see figure 2-2, map packet and table 2-1). All new construction would become classified roads and after use for the project, and put into storage for potential future management (see road definitions on p. 18). All new roads would be managed as closed year round to any type of motorized vehicle (except over snow vehicles and administrative use).

ROAD DEFINITIONS
(From FSM 7705)

**Temporary Road** – Road constructed but not necessary for long-term resource management.

**Decommissioning** – Activities that result in the stabilization and restoration of unneeded roads to a more natural state. Includes removal of all stream crossings and full recontour of the entire road prism, introduction of woody debris, and revegetation as needed.

**Storage** – A method of retaining a permanent road for future use but removing features to eliminate hydrologic risks. Includes, recontour of unstable fill slopes, cutslope stabilization, ripping the road tread, installation of no-maintenance cross ditches, and revegetation. Also includes some kind of road closure method such as with a guard rail barrier, gate, an earthen berm, or a short section of full recontour.

**Road Maintenance** – The upkeep of a road necessary to retain or restore the road to the approved road management objective.

**Classified Road** – Road determined to be needed for long-term motor vehicle access.

**Unclassified Road** – Roads on National Forest lands that are not managed in the forest transportation system. Examples include abandoned roads, unplanned roads, and roads constructed previously but not included in the system for maintenance or regular upkeep.

## Road Work to Improve Aquatic Habitat

To help reduce potential and existing sediment risks to the watershed, road maintenance activities would be performed to improve existing road drainage structures and surfaces on 5.1 miles of road (see table 2-1 and figure 2-1 in map packet). Existing roads would be improved to meet standards suitable for use by large trucks and equipment. Drainage structures in roads that pose sediment risks would be repaired, replaced, removed, or redesigned.

**Table 2-1. Alternative A road construction**

| Road | Proposed Construction Miles | Access Management at end of Project |
|---|---|---|
| 1023 B | 0.8 | Storage |
| 1023 BA | 0.6 | Storage |
| 1023 D1 | 0.3 | Storage |
| 1023 D2 | 0.1 | Storage |
| 1023 D4 | 0.2 | Storage |
| 1023 (from National Forest boundary in Section 30)) | 1.2 | Storage |
| 1023 (from end of existing 1023 to National Forest boundary) | 0.14 | Gated at junction of county road |
| **TOTAL** | 3.3 | |

**Table 2-2. Existing roads and proposed management**

| Road | Existing Miles | Access Management at end of Project |
|---|---|---|
| 1023 – From the junction of county road to intersection of 1023B | 0.7 | Closed by earthen berm at junction of county road. Road will be recontoured along the West Fork of Johnson Creek once the road is placed in storage. |
| 1023 – From the junction of 1023 B to junction of 1023A | 0.8 | Decommission |
| 1023- From the junction of 1023A to north boundary of Section 31 | 0.6 | Gated on 1023A at junction with county road. |
| 1023–From the north boundary of Section 31 to the end of the existing road | 1.1 | Gated on 1023A at junction with county road |
| 1023 A – From the junction of county road to 1023 | 1.9 | Gated on 1023A at junction with county road |
| TOTAL | 5.1 | |

## Watershed Improvements

Specific watershed improvement activities associated with the proposed action include road decommissioning (see “Road Definitions” p. 18) of approximately 0.8 mile of Forest Road 1023 and removal of two stream crossings and a bridge within the West Fork Johnson Creek drainage (figure 2-2, map packet). This road segment is currently overgrown with brush and trees. The two existing stream crossings and bridge would be removed to eliminate their future risk of causing sediment to enter the West Fork Johnson Creek. After work is completed, both ends of Forest Road 1023 would be recontoured.

## No Action (Alternative B)

New or additional management would not be implemented under the No Action Alternative. Ongoing activities such as recreation, wildfire suppression, previously identified noxious weed control, and firewood gathering would continue. This alternative provides a baseline comparison of predicted environmental consequences associated with taking no action versus implementing the action alternative.

## Features Common to Both Alternatives

**Access -** The entire project area would be managed to prohibit any type of motorized vehicle use (except over-snow vehicles) on all National Forest roads except for administrative use.

## Features of the Proposed Action

### Features Related to Roads and Access Management

**Management of Trails** – An existing non-system all terrain vehicle (ATV) trail entering the northeastern portion of the project area extending through the middle of the project area would have slashed placed on and around the trail during grapple piling. This would discourage motorized use and help provide secure nesting habitat for the existing goshawk nest adjacent to a portion of the trail.

**Management of Gated Roads During Project Activities -** During logging activities and during bow and firearm hunting seasons, existing gated roads in the project area would remain closed to all motorized vehicles not associated with the logging operation or Forest Service administrative use. While using these roads, the purchaser would not be allowed to use motorized vehicles to gather firewood, hunt, or transport big game animals from behind the gates.

**Management of Existing Closed Roads** – When road reconstruction begins on Road 1023 (Riley Creek right-of-way) the road would remain closed to public motorized vehicle use with an earthen barrier and/or gate. Once activities start, this road would remain closed with a gate to public use. The gate would be closed at the end of each day's use, during periods of inactivity, on weekends, and on holidays. After completion of sale activities, this road would remain closed to public motorized use with a gate or barrier until the road could be put in storage. Storage activities would occur after post-sale activities of planting and fuel treatment have been completed.

**Management of New Road Construction** – Road 1023 that accesses the "D" spurs (figure 2-2, map packet) would be closed on National Forest System land with a gate and/or barrier prior to road storage activities. This would deter motorized access on this road system. See Features Common to Both Alternatives – Access (on previous page) for how this road system would be managed.

### Features Designed to Reduce Effects from New Road Construction

**Road Design** – All roads would be designed and maintained to reduce water concentration, surface flow, ponding, and resulting safety and maintenance problems. Since all new roads would be put into storage following use, they would be designed to be self-maintaining and have low risk of failure. To meet these criteria, the following design features would be incorporated:

**On the 1023, 1023B, 1023BA, 1023D road spurs:** To minimize excavation and clearing work, outsloped roads with armored rolling dips would be required, except where steep road grades exist. The geology of the project area lends itself well to this type of road shape due to the rocky soils and small fill lengths. In areas where gradients are too steep for outsloped roads, insloped roads with relief culverts would be required. Cross-drains for both types of road shapes would be spaced at about 300-foot intervals or where topography is appropriate.

***Estimated Effectiveness:*** High; research (Moll et al. 1997) has shown that when the topography and geology is appropriate, as in the case in the Wrenco Loop project area, outsloped roads with frequent cross-drains reduce on site effects due to minimal area of disturbance. Outsloped roads disperse water and reduce erosion by not allowing flows to concentrate.

**Hydro-mulching and Seeding** - All road construction would require hydro-mulching and seeding on soil disturbance sites next to perennial stream crossings. Mulching would occur immediately after road construction is completed.

***Estimated Effectiveness:*** Moderate to High; this measure is 40 to 80 percent effective in reducing sediment (Burroughs and King 1989).

**Timing Restrictions** - Road maintenance activities that place drainage structures in perennial streams would take place after July 15. This is to reduce risk of effects from sediment during spring runoff and to avoid effects to westslope cutthroat trout redds.

To minimize erosion and sedimentation from ground-disturbing activities during road construction, culverts would be installed during no flow or during low flow situations. Culverts installed on the 1023D spurs would be done when Johnson Creek and West Fork of Johnson Creek are dry. Culverts installed along Road 1023 should be done during low-flow conditions, after July 15 and before September 1.

***Estimated Effectiveness:*** High; proposed road surfacing and drainage crossing upgrades would occur because they would be included in the road package as part of the timber sale contract or would be accomplished by the Forest Service using appropriated or other funding. These timing restrictions have been used on other timber sales and have proven very effective.

### Features Designed to Reduce Sediment from Existing Roads

**Decommissioning** (from the junction of road 1023B to the junction of road 1023A) – This road is recommended for decommissioning (figure 2-2, map packet) and would be recontoured in areas where required. Two log culverts and one failing bridge would be removed and the stream channel at the crossings would be restored back to natural grade. In disturbed areas, seeding, fertilizing, and placement of woody debris would follow culvert and bridge removal to establish desired vegetation and prevent noxious weed spread.

***Estimated Effectiveness:*** High; road decommissioning activities provide long-term improvements in reducing erosion and sediment delivery to stream channels. Removing culverts would prevent them from plugging and prevent the associated fill from failing and causing large quantities of sediment to be delivered to the stream (USDA Forest Service 1999a and 2000a).

**Surface and Drainage Crossing Maintenance** (from the junction of 1023A with the county road to the end of existing road 1023 (surface and drainage crossing maintenance) – The main source of erosion and sediment delivery from these roads is usually from the road surface. Road maintenance activities that would be completed and focus on reducing sediment production are blading along the road prism; spot surfacing at stream crossings; installing relief culverts where

ditch lengths are too long; cleaning and improving ditches; cleaning the inlet and outlets of culverts; and installing rolling dips and outlet ditches.

The Forest Service throughout the project area has evaluated road drainage crossings that pose a hazard and risk to aquatic species and their habitat from sediment delivery. Recommendations for each crossing may include replacing, redesigning or upgrading crossings as needed.

**Relief and In-Channel Culverts** (Road 1023 from the junction of the county road to the junction with road 1023B) **–** Relief and in-channel culverts would be designed and installed to improve water bypass under the entire road prism of the right away. Two oversized squash pipes would be sunken along both perennial stream crossings to provide for aquatic passage and reduce the risk of culvert failure. The pipes would not be removed once the road is put into storage to minimize short-term sediment increases. The low gradient stream channels along this section of road and gentle hillslope topography can allow leaving the pipes in place.

Within the wet meadow, filter fabric, rock aggregate and road surfacing would also be added to the existing road prism to reduce sediment production and delivery. The road would also be recontoured along the West Fork Johnson Creek once the road is placed into storage as the closure method.

***Estimated Effectiveness:*** High; extensive research has demonstrated that improved design, building, and maintenance of roads can reduce road-related surface erosion at the scale of individual road segments. Key factors are road location, particularly layout relative to stream systems (USDA Forest Service 1999c), road drainage (Haupt 1959, Copstead et al. 1998), surfacing (Burroughs and King 1989, Kochenderfer and Helvey 1987, Swift 1984), and cut slope and fill slope treatments (Burroughs and King 1989, Cook and King 1983, Hungerford 1984). Many studies show that surfacing materials and vegetation measures can be used to reduce the yield of fine sediment from road surfaces (Beschta 1978, Burroughs et al. 1983, Kochenderfer and Helvey 1987, Swift 1984, Foltz and Truebe 1995).

**Sediment Reduction** - Spot gravelling with approximately six inches of gravel would be required at all stream crossings, rolling dips, within the riparian habitat conservation area (RHCA), and in any perennial wet areas.

***Effectiveness Rating:*** High; this measure is 92 percent effective in reducing the amount of sediment delivered to streams (Foltz and Truebe 1995).

**Timing Restrictions** - Road maintenance activities that repair or remove drainage structures in perennial streams would take place after July 15. This is to reduce risk of effects from sediment during spring runoff and to avoid effects to westslope cutthroat trout redds.

***Estimated Effectiveness:*** High; proposed road surfacing and drainage crossing upgrades would occur because they would be included in the road package as part of the Timber Sale Contract or would be accomplished by the Forest Service using appropriated or other funding. These timing restrictions have been used on other timber sales and have proven very effective.

### Features Designed to Keep Prescribed Burns Under Control

**Underburning** - Prescribed burning treatments would be conducted according to established standards in FSM 5142 - Prescribed Fire Management. A site-specific burn plan would be prepared for each area to be burned. Burning would only occur when weather, fuel conditions, and available resources are at the levels specified in the prescribed burn plan.

***Estimated Effectiveness:*** High; burns conducted in compliance with an approved prescribed burn plan have a very high success rate for reducing fuels (USDA Forest Service 1996). The Sandpoint Ranger District has not had prescribed burns escape control lines in the past using these standards.

**Slash and Pile Burning** - Landing slash and excavator piles would be burned in late fall after heavy rains and during cooler temperatures when the risk of escape into adjoining stands and damage to residual timber is lessened.

***Estimated Effectiveness:*** High; decades of burning piles in late fall has proven successful at ensuring there have been no escaped fires in the Sandpoint Ranger District (pers. comm. with Dave Lux, District Fire Management Officer).

## Features Designed to Protect Air Quality

**Smoke Management** - All prescribed burning would be conducted following the memorandum of agreement established between the Forest Service and the States of Idaho and Montana (August 1990, project file-Air Quality section) to comply with state and federal air quality guidelines. Burning would only occur when weather and air conditions are favorable for smoke dispersal. No burning would be initiated during times when air quality restrictions are in place.

***Estimated Effectiveness:*** High; the smoke management program has effectively minimized accumulation of smoke in Idaho and Montana during prescribed burns. Measured ambient concentrations of particulate matter have decreased significantly in the town of Sandpoint in the past decade, and no violations of the ambient particulate matter standards have been found in Sandpoint since 1990.

## Features Designed to Protect Soil, Water and Fish Habitat

**Best Management Practices (BMPs)** - All activities would be designed to protect water quality and fisheries habitat. BMPs (e.g., silt fence, ditch blocks) are the primary mechanism to meet water quality standards. The Forest Service Handbook 2509.22 (Soil and Water Conservation Handbook) outlines BMPs that meet the intent of the water quality protection elements of the Idaho Forest Practices Act.

***Estimated Effectiveness:*** Moderate to high, depending on the BMP. A description of each practice and an estimate of its effectiveness are located in Appendix A. Research has evaluated the effectiveness of BMPs (Seyedbagheri 1996, USDA Forest Service Monitoring Reports 1995 - 2000). These practices would be implemented since they are requirements tied to the timber sale contract. The Forest Service timber sale administrator would frequently review the project for compliance with these and other timber sale requirements. Forest Service personnel would also conduct periodic monitoring to assess the effectiveness of these practices.

**Inland Native Fish Strategy (INFS)** - Commercial timber cutting would be prohibited in riparian habitat conservation areas (RHCAs) using the guidelines established by the Inland Native Fish Strategy (INFS). These no-cut zones include 300-foot (slope distance) protection zones for streams that have fish, 150-foot protection zones for perennial streams with no fish, and 75-foot protection zones for intermittent streams and sensitive landtypes. Ephemeral draws would have a 50-foot (slope distance) protection zone if they are either directly tied to an intermittent channel or lack large woody debris and vegetation that would prevent scouring or head cutting.

***Estimated Effectiveness:*** Generally high; these requirements would be implemented since they are incorporated into project design. A description of each applicable INFS standard and guideline and its estimated effectiveness may be found in Appendix B.

## Features Designed to Protect Wildlife Habitat

**Wildlife Tree Retention -** Snag management objectives for the project were patterned after historical conditions for vegetative communities, recognizing that the natural density and distribution of snags vary across the landscape and that current conditions may not make it possible to instantaneously meet these objectives for some areas (e.g. long-term fire suppression that interrupted natural snag recruitment, past timber harvesting).

Snags and live tree replacements would be retained where opportunities exist in treatment units at levels recommended by recent studies and scientific literature (USDI Bureau of Land Management and UDSA Forest Service 1997, p. 3-143; USDA Forest Service 2000). Snag retention objectives are consistent with recent published data that suggests that populations of cavity nesters were viable in stands of ponderosa pine and mixed conifer forests that contained about four snags per acre (Bull et al. 1997).

Where they exist, the following minimum amounts of snags and live tree replacements would be retained within cutting areas:

- Dry forest habitats: 4-6 snags/acre and 8 live tree replacements/acre from the largest representative trees.
- Moist forest habitats: 6-12 snags/acre and 12 live tree replacements/acre from the largest representative trees.

Selection of snags should emphasize practices that assure a diversity of snag structural classes and the highest probability for long-term retention. The high hazard snags and snags in the advanced stages of decay would not be used to meet retention objectives (Intermountain Forest and Industry Association et al. 1995). Retention practices would focus on larger diameter ponderosa pine, western larch, Douglas-fir and western red cedar trees, especially veteran or relic ponderosa pine and western larch trees. Trees killed by root disease should be avoided, where possible, to meet retention objectives because of their rapid deteriorate/fall-down rate.

While retention objectives are accounted for on a treatment level scale, some snags would be represented on every 10 acres of treatment, in clusters or clumps where feasible, to promote good distribution of snags. Large diameter snags (greater than 15 inches diameter) that are felled for safety reasons would remain on site to provide for large woody debris recruitment and long-term site productivity.

Slash would be pulled back from veteran or relic ponderosa pine and western larch live trees and snags to protect them from the adverse effects of prescribed burning. Grapple piling would be considered to treat fuels on moderate slopes where residual snags would be at risk from broadcast burning.

***Estimated Effectiveness:*** Moderate; this measure would be implemented using project layout, contract provisions, compliance monitoring, and fuels treatment and would have a moderate chance of avoiding and/or reducing adverse effects on snag dependent wildlife. It would not be the intent of this project to remove the high hazard snags and snags in the advanced stages of decay (“soft” snags). Some of these soft snags would survive and remain standing during the life of the project.

Past Forest Plan monitoring has demonstrated that harvesting and subsequent burning removes a large portion of existing snags, especially the soft snags. However, by leaving trees in patches or clumps, adequate numbers of snags should be relatively protected. In addition, prescribed underburning would recruit new snags by fire-killing residual green trees. Live tree replacement criteria would likely be met in that prescriptions are designed to leave ample green trees scattered across treatment areas. Consequently, this measure should provide more than the minimum number of snags and live tree replacements.

**Retention of Hardwood Trees -** To maintain forest species diversity and wildlife habitat, aspen and birch trees would not be harvested for pulp. If trees of these species need to be cut for safety reasons, they would remain on site for coarse woody debris and long-term site productivity. Selected merchantable conifers in and around aspen patches would be removed to reduce competition for water, sunlight, and nutrients. This strategy would provide benefits to various wildlife species.

***Estimated Effectiveness:*** High; these measures would be implemented through contract provisions and compliance monitoring. Effectiveness would be high because regardless of whether hardwood trees remain standing or are felled for safety reasons, they would remain on site and provide benefits to various wildlife species. Hardwoods, such as aspen and birch, would resprout if felled or killed by burning.

**Goshawk Nest Site Protection -** Mitigation measures would be implemented to help ensure that nest sites and post-fledgling areas are receiving minimal disturbance. A permanent no-activity buffer (>150 foot radius) would be placed around each known nest tree. In addition, a 30-acre buffer would be placed around each nest area to provide long-term nesting habitat (Reynolds et al. 1992). Treatments within the 30-acre buffer would be limited to activities that would enhance suitability of nesting habitat (e.g. thinning understory congestion while retaining overstory protective cover).

Purchasers operations and related Forest Service activities would be suspended within a ½-mile distance of active nest areas from March 15 to August 15 to 1) promote nesting success and 2) provide foraging opportunities for adults and fledgling goshawks during fledgling-dependency period. Activity restrictions would be removed after June 30 if the Forest Service determines the nest site is inactive or unsuccessful.

***Estimated Effectiveness:*** High; protection measures would allow continued nesting and successful rearing during implementation and in subsequent years (Reynolds et al. 1992).

**Grapple Piling -** Leave one to three slash piles per acre unburned for small forest mammals and land birds.

***Estimated Effectiveness:*** High; leaving slash piles unburned would provide replacement habitat for small mammals and land birds in the form of coarse woody debris during the few years following treatment.

**Threatened, Endangered, and Sensitive Wildlife Species Management -** If threatened, endangered, or sensitive species are located during project layout or implementation, management activities would be altered to include proper protection measures. Timber sale contract provision B6.24 (Protection of Animals, Plants and Cultural Resources) would be in the timber sale contract.

***Estimated Effectiveness:*** Moderate to High. This provision would allow for modification of the timber sale contract to avoid or protect habitat or species in the event they are discovered, though

the extent of the resulting protection would depend on the species involved as well as the timing of the discovery.

### Features Designed to Protect Soil and Site Productivity

The following practices are designed to minimize the detrimental impacts of soil compaction, displacement, severe burning, and nutrient and organic matter depletion on long-term soil productivity. The use of these practices would insure that the soil quality standards listed in the Forest Plan and Regional Soil Quality Standards would be met.

- Where present, existing skid trails would be used.
- All new skid trails would be designated.
- Where terrain is conducive, trails would be spaced at least 100 feet or more apart.
- Erosion control measures for skid trail could include either covering trails with slash and randomly placed logs (on contour) to increase the microtopography needed to reduce runoff, or stabilizing with waterbars, or a combination thereof.
- Excavated skid trails would be recontoured and seeded after logging is completed.

***Estimated Effectiveness:*** High; these guidelines exceed the requirement of the Idaho Forest Practices Act and meet the Forest and Regional Soil Quality Standard by limiting disturbance to less than 15% of the activity area (Niehoff 2002).

**Protection of Soils within Specific Stands -** Within stands 64304047, 64304050, 64304052, and 64304054 exiting skid trails would be used along with slash mats to reduce additional impacts from harvest activities.

***Estimated Effectiveness:*** High; past Forest Plan monitoring reports and literature (USDA Forest Service 1998b, 1999a, 2000a and 2001; Flatten 2003) indicate little to no detrimental soil compaction and displacement with these requirements.

**Skyline Yarding -** The intent is to reduce the potential detrimental soil impacts of displacement and compaction. The leading end of logs would be suspended during yarding. Yarding across any designated RHCA would require full suspension.

***Estimated Effectiveness:*** High; past Forest Plan monitoring (USDA Forest Service 1991) indicates low amounts of soil compaction and displacement with skyline yarding systems (Niehoff 2002).

**Temporary Road Construction -** An engineer or hydrologist would review locations of temporary roads longer than 300 feet prior to construction approval.

***Estimated Effectiveness:*** High; road location, particularly relative to streams, is a key factor in reducing road-related surface erosion at the scale of individual road segments. This feature would be implemented through contract provisions, administration of contract provisions, and compliance monitoring by the sale administrator or engineering representative (USDA Forest Service 1999c, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System, misc. reports FS-643.).

**Nutrient Protection -** The latest soil nutrient management recommendations from the Intermountain Forest and Tree Nutrient Cooperative (IFTNC) and Rocky Mountain Research Station (RMRS) would be applied as appropriate to each activity area where organic material is

removed. This may include over-wintering of fine residue (foliage and branches) to allow potassium to leach back into the soil.

***Estimated Effectiveness:*** High to moderate; based on Idaho Panhandle National Forests soil scientist recommendations (Niehoff 2002) and IFTNC nutrient management recommendations (Garrison and Moore 1998).

**Nutrient Protection on Machine or Hand-Piled Areas -** Fine residue (foliage and branches) would be left on-site over the winter to allow potassium to leach out of these materials. Piling would occur the following spring, summer or fall.

***Estimated Effectiveness:*** High; this practice is based on research and Intermountain Forest Tree Nutrition Cooperative recommendations (Baker 1989; Edmonds 1987; Garrison and Moore 1998; Laskowski et al. 1995; Moore et al. 2004; Palviainen et al. 2003).

**Retention of Coarse Woody Debris -** Management of coarse woody debris and organic matter in regeneration units would follow Forest Service Northern Region guidelines described in table 2-3. In units where existing coarse material is not sufficient, project activities would provide enough dispersed dead and downed coarse material to meet the guidelines.

***Estimated Effectiveness:*** High; based on research (Graham et al. 1994) and Forest Plan Monitoring Reports (USDA Forest Service 1998b, 1999a and 2000a), effectiveness is high when guidelines are used; implementation has been moderately successful.

**Table 2-3. Coarse woody debris requirements**

| Stands | Potential Vegetation Code | Habitat Type | Coarse Woody Debris[1] |
|---|---|---|---|
| Douglas-fir/ninebark | 260 | PSME/PHMA | 5-10 tons/acre |
| Grand fir/bear grass | 510 | ABGR/XETE | 7-14 tons/acre |
| Western hemlock/queencup beadlily | 570 | TSHE/CLUN | 17-33 tons/acre |

1 The minimum amounts listed should be retained after intermediate harvest, whereas the higher levels are recommended after final harvest and slash treatments.

**Protection during Grapple Piling or Mechanical Harvest Activities -** The harvester or grapple pile machine would operate on a slash mat.

***Estimated Effectiveness:*** High; past Forest Plan monitoring (Niehoff 2002) indicates that little to no detrimental soil disturbance.

**Protection During Logging Activities** – Winter tractor skidding is required on 285 acres and would operate under one of the three following conditions:

- on a 24-inch snow layer or 18 inches of settled snow
- on a combination of frozen mineral soil at least 2 inches thick with a minimum of 6 inches of snow maintained beneath the tread or wheels of operating equipment and logs dragged behind skidders

- on frozen ground to a depth of 4 inches with equipment operation restricted to skid trails or where adequate slash matting exists.

***Estimated Effectiveness:*** High; past Forest Plan monitoring reports and literature (USDA Forest Service 1998b, 1999a, 2000a and 2001; Flatten 2003) indicate little to no detrimental soil compaction and displacement with these requirements.

**Protection of Soils in Landings** – Landings located within timber stands 64304047, 64304050, 64304052, and 64304054 would be rehabilitated by subsoiling, seeding, and allowing slash to decompose on site.

***Estimated Effectiveness:*** High to moderate; literature indicates that decompaction by a winged subsoiler and the introduction of organic matter to tilled soils are effective in initiating soil recovery (Hogervorst 1994; Plotnikoff et al. 2000).

**Protection During Prescribed Burning Activities -** Prescribed underburning and pile burning would take place only when the upper surface inch of mineral soil has a soil moisture content of 25 percent by weight or 100 percent duff moisture.

***Estimated Effectiveness:*** High; this practice is effective in retaining s decomposing forest floor litter and organic matter to retain nutrients and soil productivity potential (Niehoff 1985).

### Features Designed to Protect Heritage Resources

In the event that heritage resources are encountered during program activities, the Idaho Panhandle National Forests has the authority to modify or stop timber sale activities. The standard heritage resources timber sale contract provision (B6.24 Protection of Cultural Resources) would be included in the timber sale contract. The provision specifically requires the contractor to notify Idaho Panhandle National Forests regarding such discoveries. Mitigation of impacts for timber sales can include but are not limited to:

- Establishing buffer zones
- Directional falling
- Altering cutting unit boundaries
- Changing road locations
- Designating skid trails away from historic properties
- Limiting the cutting methods in certain areas
- Allowing only seasonal activities
- Limiting slash disposal and tree planting activities

***Estimated Effectiveness***: High; the Idaho State Historical Preservation Office (SHPO) has reviewed and agrees with the mitigation measures and Forest Service determination on this project (see project file – heritage section). Special contract provisions are utilized in all contracts and have been effective in protecting heritage resources (USDA Forest Service 2002a, p. 22).

### Features Designed to Protect Threatened, Endangered, Sensitive and Rare Plants

Any changes to the selected alternative that may occur during layout would be reviewed, and TES plant surveys would be conducted as necessary prior to project implementation. Newly

documented occurrences would be evaluated, with specific protection measures implemented to protect population viability. Such measures could include the following;

- Dropping units from harvest activity
- Modifying unit boundaries to provide adequate buffers around documented occurrences, as determined by the project botanist and based on topography, extent of contiguous suitable habitat for documented occurrences and the type of treatment proposed
- Modifying harvest methods, fuels treatment or logging systems to protect TES plants and their habitat
- Implementing, if necessary, timber sale contract provisions to protect plants and animals (B6.24), and Settlement for Environmental Cancellation.

***Estimated Effectiveness:*** High; the measures would protect the documented population of western goblin (*Botrychium montanum*). The above measures would also assure protection of any newly documented occurrences. Protection of the identified moonwort populations from ground or canopy disturbance would preserve critical soil mycorrhizae and overstory canopy cover. Such measures have been used in previous timber sale projects, including Ruened Salvage (USDA Forest Service 1998) and Skin (USDA Forest Service 1997).

## Features Designed to Prevent the Spread of Noxious Weeds

Noxious weed treatment would be conducted according to guidelines and priorities established in the Sandpoint Weed Control Project FEIS (USDA Forest Service 1998c). Methods of control may include biological, chemical, mechanical and cultural. Herbicide treatment would not exceed the maximum treatable acres established under the Sandpoint Weed Control Project FEIS adaptive strategy. A table displaying maximum treatable acres in the Johnson Creek drainage is included in the project file- weeds section.

Gravel or borrow pits to be used during road construction or reconstruction would be free of new weed invader species (as defined by the Idaho Panhandle National Forests Weed Specialist). A list of weed species considered potential new invaders is included in the project file – weeds section.

Any priority weed species (as defined by the Idaho Panhandle National Forests Weed Specialist) identified during road maintenance would be reported to the District Weed Specialist. A list of priority weed species is included in the project file – weeds section.

Weed treatment of all haul routes and service landings would occur prior to ground-disturbing activities where feasible. If the timing of ground-disturbing activities would not allow weed treatment to occur when it would be most effective, it would occur in the next treatment season following the disturbance.

All timber sale contracts would require cleaning of off-road equipment prior to entry onto National Forest lands. If operations occur in areas infested with new invaders (as defined by the Idaho Panhandle National Forests Weed Specialist), all equipment would be cleaned prior to leaving the site.

All newly constructed roads, skid trails, landings, or other areas of disturbance (including maintenance on existing roads) would be seeded with a weed-free native and desired non-native seed mix and fertilized as necessary.

All straw or hay used for mulching or watershed restoration activities would be certified weed-free.

Road segments identified for weed treatment and proposed for obliteration would be treated prior to obliteration.

***Estimated Effectiveness:*** The above mitigation measures are accepted weed prevention practices developed by public land management agencies and university cooperative extension offices and promoted by weed management organizations across the nation (e.g. Sheley et al. 1997, Drlik et al. 1998, USDA Forest Service 2001a).

For new weed invaders, the estimated effectiveness of the above measures is high; the measures are expected to be very effective at preventing establishment of new invaders. According to current research (Hobbs and Humphries 1995), early detection and treatment of infestations before explosive spread occurs can significantly reduce the social cost of weed invasions.

For existing infestations of sulfur cinquefoil, common tansy and oxeye daisy, estimated effectiveness is moderate to high; the measures are expected to be somewhat to very effective at reducing the spread of these in the project area. However, any untreated infestations on private timber industry land in the project area would continue to be a source of spread of these species.

For existing infestations of goatweed and knapweed, estimated effectiveness is expected to be low in portions of the project area where these weeds are already established in natural openings away from existing and proposed roads. The above measures would be expected to have moderate to high effectiveness at reducing infestations of goatweed and knapweed associated with existing and proposed roads. However, any untreated infestations on private timber industry land in the project area would continue to be a source of spread of these species.

## *Monitoring*

The Forest Plan documents a system to monitor and evaluate activities on the forest. Monitoring and evaluation each have distinctly different purposes and scope. Monitoring is designed to gather the data necessary for project evaluation. During evaluation of project effectiveness, data gathered are analyzed and interpreted. This process provides periodic data necessary to determine if implementation is within the bounds of the project design (Forest Plan, page IV-7). For activities in the Wrenco Loop area, all alternatives would comply with specific monitoring requirements identified by the Forest Plan (Chapter IV). The length of time that monitoring is needed would be determined by the results and evaluation of what is being monitored. When it is certain that regulations and standards are being met, monitoring of a particular element will cease.

Not all monitoring is considered mandatory and its implementation is not a consideration in the determination of environmental effects. The monitoring projects listed below are designed to be accomplished during project activities but are dependent upon the availability of funds and other resources.

### Forest Plan Monitoring

**Noxious Weeds:** According to the Forest Plan, “many noxious weed species (knapweed, goatweed, thistle, tansy, etc.) are widespread, and…major programs to eradicate such species are not possible within expected budget levels”. Idaho Panhandle National Forests direction is to give priority to small infestations of “species new to an area, where moderate control actions have

a good chance of preventing the establishment of new problems". Noxious weed control will be based on an integrated pest management approach.

**TES Plants:** Idaho Panhandle National Forests direction is to inventory and manage sensitive plants so that no new species have to be listed as threatened or endangered. Suitable sensitive plant habitat in project areas is surveyed and projects modified as necessary to achieve this objective. Sensitive Plants are protected according to site-specific management plans developed by Forest, Zone or District Botanists.

## Project Monitoring (Implementation and Effectiveness)

Project implementation generally involves the efforts of a variety of individuals with both specialized and general skills and training. Employees are accustomed to working together to achieve the desired project objectives. For example, it is common for a sale preparation forester or sale administrator to discuss specific project conditions with the wildlife biologist or hydrologist to apply the best practices on the ground. Joint field reviews are conducted as needed. This steady, informal communication allows for incremental adjustments throughout layout and project implementation to achieve the desired results. In addition to these less formal monitoring procedures, the following monitoring items would be conducted:

### *Noxious Weeds*

Pretreatment of roads and equipment as proposed (Features Common to All Action Alternatives) would be documented on sale inspection reports. The effectiveness of seeding disturbed areas would be evaluated upon completion of the activity. Treated areas would be surveyed and monitored according to treatment priorities established in the Sandpoint Noxious Weed Control Project FEIS.

### *TES Plants*

Monitoring of sensitive plant populations where the proposed activity was modified by buffering to avoid adverse effects would be conducted to validate the effectiveness of mitigation measures during and following the activity.

### *Forest Vegetation*

All regeneration-cutting units would be monitored for regeneration success the first, third, and fifth year following planting, if necessary.

### *Best Management Practices*

BMPs would be incorporated into many phases of the project. A hydrologist would review the planned design of all road maintenance to ensure compliance with BMPs. The engineering representative and the hydrologist would monitor all temporary and road maintenance to ensure that they were built or restored to specifications.

A sale administrator would visit each active cutting unit at a frequency necessary to ensure compliance with the BMPs and the timber sale contract. Minor contract changes or contract modifications would be agreed upon and enacted, when necessary, to meet objectives and standards on the ground.

### *Air Quality*

Air quality is monitored by the North Idaho and Montana Airshed Groups during the fall and spring burning seasons and yearlong by the Idaho Department of Environmental Quality.

### *Visuals*

The project would be reviewed by the District visual resource specialist before, during and after cutting operations are complete to assess whether visual quality objectives were met.

## *Other Restoration Projects*

**Noxious Weed Treatment and Monitoring -** Disturbed sites would be monitored, and weed treatment would be accomplished as necessary. An Integrated Pest Management approach (including biological, mechanical, cultural, and chemical control) would be used. This would decrease the chance of existing infestations becoming established in new areas, and would reduce the risk of new invaders becoming established. All weed management activities would be conducted in accordance with the guidelines in the Sandpoint Noxious Weed Control Project FEIS (USDA Forest Service 1998c).

# Alternatives Considered But Not Given Detailed Study

The alternatives suggested in the scoping process and the rationales for not giving them detailed study are discussed below.

## Original Proposed Action

The proposed action has evolved over many years. The silvicultural prescription for some areas proposed for treatment has changed due to recent field verification. Portions of these areas have deteriorated due to increased insect and disease activity. The initial intent was to thin these stands. Due to the amount of mortality, a thinning is not feasible; in this case, regeneration harvest is proposed. These changes were based on changed vegetative conditions as ground verification revealed new information making some areas higher priority and others lower priority. The proposed road construction to access the area has changed due to public comments and concerns. Further ground verification revealed an alternate route to be more feasible and less ground-disturbing. With this change, stream crossings have been eliminated, logging systems have changed in some areas to be less ground-disturbing, and the type of road construction has significantly reduced temporary roads and made all new construction permanent system roads. The development of a trail system has been eliminated due to public comments and concerns. For these reasons, this alternative, with its options was eliminated from further consideration.

## No New Road Construction

No new roads would be built with this alternative, only existing roads would be used. Watershed restoration would occur in the areas where known sediment sources exist. The areas that could be harvested using the existing roads (assuming acquisition of right-of-way from Riley Creek timber company) and conventional logging systems constituted a small portion of the project area. The remaining priority stands within the project would be helicopter logged.

The project area lies within Forest Plan management areas 1 and 4. The intent of both these management areas is for long-term management. The lack of access into this area creates more complex problems for both fuels reduction and vegetative management now and in the future.

The complexity lies in the increased demand on resources due to lack of access for slash piling, prescribed burning, planting, and precommercial thinning. Much of this work would require long walks to reach the site(s). There is a risk of accomplishing future work in the area with a lack of access.

Thinning with a helicopter in young moist stands is difficult without creating damage to the residual trees. Pulling trees up through a dense crown canopy creates undue crown damage, which can have negative effects on residual tree growth.

Without adequate access for fire suppression there is a decreased probability of fire suppression success due to slower response time and lack of equipment access for engines. For these reasons, this alternative was eliminated from further consideration.

## Treat the Ecosystem without Logging

We received comments requesting that we consider alternatives that strive to achieve our ecosystem restoration objectives without using timber cutting. These alternatives were suggested several different ways:

### *Prescribed Burning Only*

This alternative was considered after we received suggestions to use prescribed fire to reduce stand density without cutting trees. Using prescribed burning as the primary tool would not be effective at achieving the objectives of the purpose and need for most of the project area. Safe and controlled prescribed fires are planned in spring and fall when weather and moisture conditions help fire managers keep fire intensities and severities low. In stands where thinning is the objective, shady conditions and lack of continuous natural fuels would make burning in spring or fall difficult. Trees would not be thinned effectively with fire alone to achieve desired composition, cover, structure, and pattern. In order to get a fire to achieve the objectives of thinning in the shady stands, hotter and drier conditions would be necessary, and this would likely result in a lethal crown fire, which could kill most of the trees.

In areas where the objective is to regenerate the stand, using fire to accomplish objectives in those stands would require igniting the stands in hot and dry conditions to produce a lethal fire that would kill enough of the trees and brush, and create the openings needed for regenerating desired species. Such conditions would cause too great a risk of consuming more than just the trees in the areas proposed for regeneration, and would risk loss of control putting adjacent private lands at a high risk.

Although other objectives of our purpose and need (reducing sediment risks) could still be accomplished without treating the forest vegetation, little would be achieved to begin moving toward a forest structure and composition that emphasizes long-term dominance of shade intolerant species. This alternative would also not meet Forest Plan standards for reforestation, reduction of susceptibility to insect and disease damage, site preparation and reduction of fire intensity and spread (see Chapter I). For these reasons, this alternative was dropped from further consideration and was eliminated from further study.

### *No Timber Cutting, Restoration Only*

This alternative would be similar to the Prescribed Burning Only alternative and for the same reasons described above, was eliminated from further consideration.

### *Accomplish Purpose and Need Without Using Commercial Logging*

This alternative suggested accomplishing all the elements of the proposed action, including cutting trees, without selling the trees in a commercial logging operation. To carry out this alternative would mean that either the cut trees would be left on site, or the Forest Service would have to pay someone to remove the trees. To leave the trees on site would add a large amount of fuel and increase breeding areas for insect infestations. It would make planting difficult and create areas inaccessible to some wildlife where logs were left. Prescribed burning would not be possible because of the large amount of fuels left on site. If a wildfire were to start in one of these areas, suppression would be extremely difficult as well. In addition, leaving merchantable trees on site would waste usable wood fiber that could just as easily be utilized as products. A timber sale provides us with a means of accomplishing our objectives at a reduced cost, to treat fuels more effectively, and results in a benefit of timber as a by-product.

This alternative would not meet Forest Plan standards for reforestation, reduction of susceptibility to insect and disease damage, site preparation, utilization of forest products, and reduction of fire intensity and spread (see Chapter I). For these reasons, this alternative was dropped from further consideration and was eliminated from further study.

## Summary Comparison of Alternatives

Tables 2-4, 2-5, and 2-6 summarize activities proposed, how well each alternative meets the purpose and need, and what the predicted effects are from each alternative on the issues analyzed.

**Table 2-4. Proposed activities by alternative**

| Activities | Alternative A | Alternative B |
|---|---|---|
| **Vegetation Treatments (Acres)** | | |
| Thinning | 530 | 0 |
| Regeneration Cutting | 82 | |
| Total Stand Treatment Acres | 612 | 0 |
| **Logging Systems (Acres)** | | |
| Skyline | 86 | 0 |
| Tractor | 240 | 0 |
| Tractor Winter | 285 | 0 |
| **Road Work (Miles)** | | |
| Road Construction | 3.3 | 0 |
| New Road Storage | 3.3 | 0 |
| Existing Classified Road Decommissioning | 0.8 | 0 |
| Road Maintenance | 5.1 | 0 |
| **Fuel Treatments (Acres)** | | |
| Underburn | 141 | 0 |
| Grapple Pile | 471 | 0 |
| Total Fuels Treatment | 612 | 0 |

**Table 2-5 How well alternatives achieve the purpose and need**

| Purpose | Alternative A | Alternative B |
|---|---|---|
| Restores desired forest cover, structure, pattern, and species composition across the landscape where they are outside natural or historic ranges | Yes | No |
| Provides for wildlife habitat diversity | Yes (increase) | Yes (maintain) |
| Begins moving toward a forest structure and fuel condition that would aid in suppression of wildfire adjacent to private land. | Yes | No |
| Reduces risk of existing potential sediment sources associated with past road construction. | Yes (provides for long-term protection post-project) | No |

**Table 2-6. Summary of effects on analysis issues**

| Issue | Alternative A | Alternative B |
|---|---|---|
| **FOREST VEGETATION**<br>Measurement Criteria: Percent change in cover type (existing dominant trees), percent change in structure, and changes in landscape pattern (measured by FRAGSTATS). | 10% change in overall cover type.<br>82 acres change from immature to shrub/seedling/sapling stage<br>Patch size would increase for early succession stage larger mean patch size which is a trend toward the historic range | For the project area as a whole, no change in composition or structure in the next 10 years. |
| **FIRE SUPPRESSION**<br>Measurement Criteria Projections of future stand conditions and fuel loadings, comparable conditions in vegetation types, prescribed burning and fire suppression in similar fuels and terrain. Fire spread rates and intensities will be estimated using BEHAVE Plus | Will reduce the fuel loading to levels that permit unwanted wildfire ignitions to be suppressed by planned initial attack forces.<br>Flame lengths of 2 feet. | Mixed severity fires will continue: most fires will be at low to moderate intensities and size, creating small pockets within overall stand structure. On an infrequent basis, when long-term drought or extreme weather conditions are coupled with a fire ignition, larger, stand-replacement fires could burn within the project area and beyond, onto adjacent State and private lands. Flame lengths of 4 feet. |
| **PLANTS**<br>Measurement Criteria: Relative amount of canopy opening and/or ground disturbance in and adjacent to document4ed rare plant populations or suitable habitat. | May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or a loss of viability of the population or species. | No direct or indirect impacts to TES plants would occur. |

| Issue | Alternative A | Alternative B |
|---|---|---|
| **NOXIOUS WEEDS**<br>Measurement Criteria: Relative amount of canopy removal and ground or understory vegetation disturbance | Overall, with implementation of the design criteria in Chapter 2, the project is expected to have little effect on the existing weeds in the project area, neither reducing nor increasing populations in the next 10 years. | No change in the risk or rate of weed spread. |
| **WILDLIFE**<br>**Boreal Toads**<br>*Measurement Criteria:* Protection and quality of wetlands | This alternative protects wet and riparian areas and would only have minor short-term impacts to individuals. | No Impact |
| **Flammulated Owls**<br>*Measurement Criteria:* Changes in habitat suitability (late forest structure and composition, large snag habitat) | Habitat improvement would result from understory shrub development; thereby, improving foraging habitat. Conversion and maintenance of seral species would provide for long-term maintenance of preferred habitat. Over the long-term, high quality, large-diameter snags would enhance nesting habitat. | Stands would continue to decline in health and vigor and would become increasingly crowded with immature trees. Ponderosa pine and western larch would continue to be replaced by shade-tolerant species. There would be a long-term shift in to small diameter snags as the stands become more crowded. |
| **Fringed Myotis**<br>*Measurement Criteria:* Changes in habitat suitability (late forest structure and composition, large snag habitat) | Habitat improvement would result from understory shrub development; thereby, improving foraging habitat. Conversion and maintenance of seral species would provide for long-term maintenance of preferred habitat. Over the long-term, high quality, large-diameter snags would improve habitat for fringed myotis. | Stands would continue to decline in health and vigor and would become increasingly crowded with immature trees. Ponderosa pine and western larch would continue to be replaced by shade-tolerant species. There would be a long-term shift in to small diameter snags as the stands become more crowded. |
| **Pygmy Nuthatch**<br>*Measurement Criteria*: Changes in habitat suitability (late forest structure and composition, large snag habitat) | Habitat improvement would result from understory shrub development; thereby, improving foraging habitat. Conversion and maintenance of seral species would provide for long-term maintenance of preferred habitat. Over the long-term, high quality, large-diameter snags would improve habitat for pygmy nuthatch. | Stands would continue to decline in health and vigor and would become increasingly crowded with immature trees. Ponderosa pine and western larch would continue to be replaced by shade-tolerant species. There would be a long-term shift in to small diameter snags as the stands become more crowded |
| **Northern Goshawks**<br>*Measurement Criteria:* Changes in habitat suitability (late forest structure, disturbance) | Harvested areas would trend from crowded, immature stands to open stands with larger, more mature trees. Selective harvest would promote forest species and structure that provides desirable goshawk nesting and foraging habitat. In the long term, this alternative would improve nesting habitat and would result in an increase in nesting and foraging habitat. | Stands would continue to increase in stem densities and become increasingly crowded; thereby, detracting from its attractiveness to goshawks in some areas. |

| Issue | Alternative A | Alternative B |
|---|---|---|
| **Black-backed Woodpeckers**<br>*Measurement Criteria:* Quality and distribution of snag habitat | This alternative would result in some reduction in snag habitat in the project area over the short term; however, snag retention guidelines would provide habitat to maintain viable woodpecker populations. | Stands would continue to decline in health and vigor, ultimately resulting in higher levels of tree mortality fuel loads, and fire risk or disease outbreaks. Disease outbreaks or fire could result in a temporary increase in black-backed habitat. |
| **Pileated Woodpeckers**<br>*Measurement Criteria:* Quality and abundance of large diameter trees and snags | In the long term, this alternative would improve pileated woodpecker nesting habitat within the project area by increasing high quality, large-diameter snags. | Stands would continue to become crowed with immature trees, snags would eventually shift to small diameter snags that are not suitable for pileated woodpecker nesting. |
| **Martens**<br>*Measurement Criteria:* Forest structure; Abundance of downed woody material | Downed wood would likely be reduced in those areas proposed for burning, however design features related to down wood would help compensate for this loss. In the long term marten habitat would be improved through creation and maintenance of large-diameter, seral forest species. | Stands would continue to decline in health and vigor and would become increasingly crowded with immature trees, which would not provide the large complex forest structure that marten need. |
| **White-tailed Deer Winter Range**<br>*Measurement Criteria:* Changes to critical winter range | Most of the critical winter range would be thinned, resulting in some form of canopy reduction. However, the resulting canopy cover would still meet the criteria for suitable winter range cover conditions. As trees within the treated stands are released from competition with dense understory trees, canopy cover would recover and the stand would provide improved winter range conditions over time | As succession continues within the forest stands, canopy cover would continue to increase and this would improve thermal cover conditions. However, as the stands decreased in health and vigor, the area would become more susceptible to fire, disease and insect out breaks, which would in turn, open canopies and decrease the value thermal cover for white-tailed deer |
| **Forest Land Birds**<br>*Measurement Criteria:* Forest health and stand structure; Habitat diversity | Short-term impacts to forestland birds would occur as a result of temporary disturbance caused by underburning, tree removal and road construction. A short-term loss in the productivity of nesting birds within the project area may occur because of spring underburning. However, over the long term, this would be offset by increased vegetative diversity, thus providing more niches for a greater abundance and diversity of birds<br>There would be a reduction in snag densities over the short-term; however, design features for snag retention would minimize impacts. Over the long term, this alternative would result in high quality, large-diameter snags that would enhance habitat for snag dependent species. | Stands would continue to decline in health and vigor and would become increasingly crowded with immature trees. This trend would result in decreased vegetative diversity and, ultimately, decreased habitat for forest land birds. |

| Issue | Alternative A | Alternative B |
|---|---|---|
| **SOIL PRODUCTIVITY**<br>*Measurement Criteria:* Percent detrimental impact by activity area and disturbed soils, acres of potential loss of potassium and woody debris, activities on sensitive landtypes. | Currently none of the project area is considered detrimentally disturbed using the R-1 definition (excluding permanent roads). All activity areas (stands) proposed for harvest would maintain less than 15% detrimental impact (see Table 3-19); therefore, meeting R-1 and IPNF soil productivity standards<br>Most potassium and large woody debris would be retained on site through design criteria.<br>Approximately 53 acres of landtype unit 190 would be entered. Given the topography of these 53 acres, the lack of existing or planned roads, harvesting during the dry season, and skid trail erosion control would result in fairly low surface erosion potential. | Direct and indirect effects remain at 0% provided no severe wildfire created hydrophobic soils. Potassium and large woody debris retained on site provided there are no future severe wildfire. |
| **WATER QUALITY AND FISH HABITAT**<br>*Measurement Criteria:* Reduction in canopy cover, sediment yield (predicted by the Water Erosion Prediction Project – WEPP), and their effects on fish habitat. | Predicted runoff decrease slightly from an average annual runoff of 0.65 acre-feet under existing conditions to 0.62 acre-feet.<br>Probability of increased peak flows is minimal.<br>Sediment production reduced from existing 2.38 tons/yr to 0.94 tons/yr<br>No impact on fish from timber harvesting, due to design criteria. | No direct effects on current runoff or sediment yield in the project area. Existing sediment yields from hillslopes and roads would continue. The potential sediment contribution to West Fork Johnson Creek by the two log culverts and one abandoned bridge along Road 1023 would also remain.<br>No direct effect on fish habitat. Indirectly habitat conditions would continue to recover from historic disturbances. |
| **AIR QUALITY**<br>*Measurement Criteria:* Emissions predicted with First Order Fire Effects Model (FOFEM), and whether or not air quality standards are met. | 65.1 lbs/acre of PM10 created during burning<br>55.2 lbs/acre of PM2.5 created during burning<br>Project designed to prevent the smoke from causing a violation of the NAAQS. | No direct effect on air quality. |
| **VISUAL QUALITY**<br>*Measurement Criteria:* Evaluation of whether or not Forest Plan standards for visual quality are met. | Visual Quality Objectives or partial retention and modification met. | Visual Quality Objectives of partial retention and modification met. |
| **PROJECT FEASIBILITY**<br>*Measurement Criteria:* Predicted high bid calculated by the Region 1 timber sale Transactions Evidence Appraisal. | $242,869.19 | $0 (no associated timber sale) |

# CHAPTER 3 ✧ Affected Environment and Environmental Consequences

## Introduction

This chapter describes the existing condition of resources analyzed, and discloses the predicted effects of the alternatives described in Chapter 2, including design criteria. The chapter is organized for each resource as follows:

- **Regulatory Framework –** describes the Forest Plan standards and goals for resource management and any other laws or policies that direct management activities.
- **Analysis Area –** describes the area to be analyzed and provides rationale for the cumulative effects analysis area.
- **Analysis Methods –** explains what data and models were used to determine effects, and the criteria that will be used to measure effects.
- **Affected Environment –** explains the existing condition of the resources so that changes caused by the alternatives can be measured. The resource information provided in the Affected Environment narrative includes the effects of past and ongoing actions that have influenced the existing condition of the landscape. These actions are listed in table 3-1.
- **Environmental Consequences –** discloses the predicted effects of the alternatives and their design criteria described in Chapter 2. Effects are divided into Direct and Indirect Effects, and Cumulative Effects. Direct and indirect effects are those that are caused by the action. Cumulative effects are those that occur when other actions have impacts on a resource. A list of past, present and reasonably foreseeable actions appear in table 3-1.
- **Consistency with Forest Plan and Other Laws and Regulation –** a finding of whether the alternatives, if implemented, would comply with the Forest Plan standards and other laws that regulate resource management described in the Regulatory Framework section.

### *Past, Present and Reasonably Foreseeable Actions and Events*

Photo 1 is a 1933 photo of what the landscape looked like after the fire in the 1920s. This fire influenced the forest vegetation on the landscape, as did the human activities that followed. Table 3-1 displays the past, present and reasonably foreseeable actions and events relevant to this analysis. Figure 3-1 (map packet) shows some of the past timber harvest. There are no maps in our records of harvest that occurred on National Forest between the 1940s and 1960s. Areas shown on figure 3-1 are an estimate based on aerial photographs and field surveys over the years. Past harvests on other ownerships were estimated using aerial photographs and personal observation. The type of harvest was estimated from aerial photographs. Despite the lack of precise maps, these surveys provided adequate information to analyze the effects of these activities on resources of concern. The project record provides detailed information for past actions on National Forest lands. The list of past actions is not necessarily exhaustive, as records may not exist for all these past activities (by project), especially those actions that predate the passage of NEPA in 1970.

**Note:** One reasonably foreseeable action not mentioned in table 3-1 is a Forest Plan amendment to remove the fry emergence standard for fish because it cannot be accurately measured. Details of the effects of this amendment are discussed in the Aquatics section under cumulative effects.

**Table 3-1. Past, ongoing, and foreseeable activities and events considered for cumulative effects**

| PAST ACTIVITES AND EVENTS | | | | | |
|---|---|---|---|---|---|
| **Legal Location (T57, R3W)** | **Drainage** | **Estimated Acres** | **Year** | **Description** | **Miles of Road Construction or Use** |
| Project area and surrounding sections | Smith Cr., Johnson Cr. | 2,000 | 1926 | **Severe Wildfire**<br>Stand-replacing fire in 1926 destroyed most of the tree cover, as evidenced by the current age, structure, and tree heights of the stands. | N/A |
| N½ Sec. 31, E½ Sec. 30 | Johnson Creek | 300 | 1947 | **Salvage – National Forest Lands**<br>Harvest of larger scattered trees on areas covered with good stands of reproduction. Removed approximately 157 mbf.* Assume tractor yarding. | Unknown |
| SW¼ Sec. 20, NE¼ Sec. 30 | Johnson Creek | 40 | 1953 | **Salvage – National Forest Lands**<br>Removed approximately 30 mbf. Of large-diameter trees. Assume tractor yarding.` | Unknown |
| NW¼, SW¼ Sec. 20 | Johnson Creek | Unknown | 1958 | **Salvage – National Forest Lands**<br>Removed beetle-infested ponderosa pine along ridge on east side. Salvage DF infected with mistletoe.* Assume tractor yarding. | Unknown |
| N½ Sec. 31 | Johnson Creek | 350 | 1965 | **Salvage – National Forest Lands**<br>After cut residual stand of pole timber on better sites. Removal of mature and defective trees improve spacing on better sites leaving stands in good growing condition.* Removed approx. 360 mbf. Tractor yarding. | 2.5 miles w/0.6 mi temp. easement |
| NW¼, N½ Sec. 31 | Johnson Creek | Unknown | 1965 | **Post and Pole Sale – National Forest Lands**<br>No detailed information. These sales usually remove small diameter material in a designated area. | 0 |
| Sec. 30, 31 | Johnson Creek | N/A | Late 1980s | **Road Construction – private land**<br>Consisted of new road construction on DAW land which later was bought by Riley Creek Lumber Company. | 3 miles constructed |
| Sec. 30, 31 | Johnson Creek | N/A | 1980s | **Selective Timber Harvest – private land**<br>This land was owned by DAW Lumber Co., it appears as though selective harvest occurred during this time period. No data is available to document this. Assume tractor yarding. | N/A |
| Sec. 30, 31 | Johnson Creek | 340 | Winter 2004 | **Selective Timber Harvest – private land**<br>By Riley Creek Lumber Co. using salvage thinning prescriptions and tractor yarding system. | N/A |

*Comments taken directly from timber sale reports, or report attached to contract

**ONGOING ACTIONS (Includes Past Activities)**

| Legal Location (T57, R3W) | Drainage | Year | Description | Miles of Road Construction or Use |
|---|---|---|---|---|
| Sec. 20, 29, 32 | Johnson Creek | Ongoing | **Urban Development in Rural Areas –** Consists of logging, subdivisions and development of open lands | May or may not include new road development |
| Sec. 19, 30 31 | Johnson Creek | Ongoing | **Hunting –** Consists of individuals primarily on foot using existing adjacent roads to access the project area for hunting. Off-road use is limited/minor. | N/A |
| Sec. 30, 31 | Johnson Creek | Ongoing | **Motor Vehicle Use –** Consists of the use of Riley Creek Timber Company road system within the project area. | Approx. 3 miles of existing road use |
| Sec. 30, 31 | Johnson Creek | Ongoing | **Road Maintenance –** Consists of the maintaining of road system on Riley Creek timber Company lands within the project area boundary. | Approx. 3 miles |
| Sec. 19, 30, 31 | Johnson Creek | Ongoing | **Motorized and Nonmotorized Recreation –** Motorized recreation consists of occasional ATV use on nonsystem trails. Nonmotorized recreation consists of local residents hiking/horseback riding within the project area. | N/A |
| Project Area | Johnson Creek | Ongoing | **Wildfire Suppression –** Consists of extinguishing either human or natural fire ignition. | N/A |

**REASONABLY FORESEEABLE ACTIONS**

| Legal Location (T57, R3W) | Drainage | Est. Acres | Year | Description | Miles of Road Construction or Use |
|---|---|---|---|---|---|
| S½ Sec. 31 (Riley Creek Lumber Co) | Johnson Creek | 320 | May 2005 | **Overstory Removal** approx 80 acres, leaving approximately 2-3 mbf/acre. **Sanitation Salvage** log approx. 240 acres, leaving approx. 4 mbf/acre. Helicopter and tractor yarding systems. | N/A |
| Sec. 16, 17 (ID Dept. of Lands) | Smith Creek | 317 | May 2005 | **Forest Management Activities –** Clearcut, Seed Tree, Shelterwood, Commercial thin. Remove approximately 3.5 mbf. Tractor and skyline yarding systems. | 2 mi new construction, 5 mi reconstruction; 1.2 mi road abandonment. |
| Sec. 21, 29, 30, 32, 33 | Johnson Cr., Smith Cr. | Not Avail. | Ongoing* | **Certificate of Compliance Fire Hazard Management Agreement** from the Idaho Department of Lands. As of 5/11/05 15 permits have been issued. | Various |
| Sec. 19, 30, 31 | Johnson Creek | Not Avail. | Ongoing | **Noxious Weed Treatment** Consists of monitoring and treatment of noxious weeds on federal and private lands. | N/A |

*These permits are obtained by the landowner from the Idaho Department of Lands. Issuance of these permits does not mean that all or any will happen in a given time frame.

**Photo 1. Portions of Johnson Creek and Smith Creek in 1933. Note that only a portion of the project area is included in the upper left portion of the photo, and how little vegetation remains following the 1926 fire.**

# Forest Health and Productivity

## *Regulatory Framework*

Regulatory constraints applicable to managing forest vegetation within the project area include the Idaho Forest Practices Act, Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), National Forest Management Act of 1976 (NFMA), Idaho Panhandle National Forests Forest Plan (USDA Forest Service 1987), and Forest Service policy.

## *Analysis Methods, Data, and Information Used*

Existing and historic vegetation conditions for the project area were determined using aerial photos (1933 to present, located in the photo files at the Sandpoint District office), stand exam data (stand files and the Timber Stand Management Record System (TSMRS) database at the Sandpoint District office), and 2004 field review notes (located in the project file – vegetation section), historic information, the Interior Columbia Basin Ecosystem Management Project

(ICBEMP) Scientific Assessment (Quigley and Arbelbide 1997), the Northern Region Overview (USDA Forest Service 1998a) and data from the Pend Oreille Geographic Assessment (USDA Forest Service unpublished report). Vegetation conditions on private lands have been obtained from aerial photos, historical records, and personal knowledge.

A more detailed list of information and assumptions used are in the vegetation section of the project file.

### Analysis Area

The direct, indirect, and cumulative effects analysis area for forested vegetation is the National Forest portion of the project area, since proposed activities would only change the forest characteristics within this area. The acreage proposed for treatment is not large enough to affect the forest parameters at the subbasin scale.

## *Affected Environment*

### Characterization of the Coniferous Vegetation

The following sections provide an ecological overview of forest conifer conditions at the very large landscape scale of the Interior Columbia Basin, and step down through several geographic levels to conditions at the scale of the Wrenco Loop project area. As the geographic areas get smaller, the ecological information becomes more specific.

#### *Columbia River Basin*

Disturbances such as fire and insect mortality have played an important role in determining forest tree composition. In northern Idaho and eastern Washington, the most significant historic natural disturbance was fire. Land management activities and introduced pathogens have dramatically altered the species composition and age of trees in the overstory (Quigley and Arbelbide 1997).

Historically, coniferous tree composition in the Interior Columbia Basin was dominated by ponderosa pine, western larch, and western white pine. Effective fire suppression, the loss of white pine due to the introduced blister rust, and land management activities such as logging have caused the forests to change. Forests across the Interior Columbia Basin are now dominated by shade-tolerant grand fir, western hemlock, and Douglas-fir. These species are more vulnerable to disturbances such as insects, diseases, and fires. They are less adapted to fire, drought, and natural climatic variability than the species they replaced. The results are more insect and disease activity and higher fire risk.

Ponderosa pine, western larch, and western white pine were typically established after some form of disturbance and have the potential to occupy a site for 200-300 years. Many of the local disturbances not only initiated these long-lived species, but also maintained them in mature conditions. Stands of these trees were adapted to regenerate in and survive local fire regimes. Other disturbances, such as historic levels of insect populations and wind and winter storm damage, contributed to stand mortality. As trees died, they became fuel wood and over time, created conditions for stand-replacing fires.

#### *Northern Region Overview*

The Northern Region Overview (USDA Forest Service1998a) focused on priorities for restoring ecosystem health and availability of recreation opportunities. The assessment describes changes in coniferous vegetation:

> *"In northern Idaho and moist portions of western Montana, Douglas-fir was largely an early succession species that regenerated well after wildfire in various mixes with white pine and larch, but then was largely eliminated by root diseases and bark beetles after 100-140 years, giving way to pine and larch. In the absence of white pine and larch, we have experienced an increase in Douglas-fir during early succession, and an apparent increase in root disease inoculum levels as succession proceeds. This condition, with ladder fuels, promotes and increases risk of stand-replacement fire."*

The Northern Region Overview further states:

> *"The most significant societal and ecological risk is associated with fire; particularly where ladder fuels exist or are developing near or adjacent to urban interface locations."*

### *Pend Oreille Subbasin Geographic Assessment*

Because of the local variation in landscape change throughout the Columbia Basin, the Idaho Panhandle National Forests have completed a geographic assessment for the three northern subbasin ecosystems (USDA Forest Service unpublished report). The data for this assessment compare historic and current ecological, social, and economic conditions of the Pend Oreille subbasin. The assessment also identifies ecosystem trends and changes in vegetation over the last 100-200 years. Findings of the geographic assessment are similar to those of the Northern Region Overview and Interior Columbia Basin Assessments, but provide specific information on lands in the Pend Oreille subbasin ecosystem. Geographic assessment data are used in this chapter to compare with the project area. Tables, and characterizations that have been assembled during the subbasin analysis are referenced as "USDA Forest Service unpublished report" or Zack 2000. Much of this data is also supported by research and literature referenced in Zack 1999.

### *Wrenco Loop Project Area (History and Disturbance)*

The analysis area for vegetation was in private ownership until 1926. The area was severely burned sometime in 1926. This fire was severe enough to destroy most of the tree cover, as evidenced by the current age, structure, and tree heights of the stands. Currently, most trees are 60 to 110 feet tall and are generally in the 80+-year age range.

Following the 1926 fire, the area was transferred to Bonner County and then in 1946 to Federal ownership. The Forest Service carried out salvage and overstory removal harvests in 1947, 1953, and 1965. These cuttings are assumed to have removed most of the larger diameter trees that survived the 1926 fire. However, a few scattered individuals and patches of large diameter trees remain. These small patches and scattered individual trees within stands do not meet old growth definitions (Green et al. 1992 and 2004 errata correction). Specific information pertaining to these sales can be found in table 3-1 and the project file. Four small fires are known to have occurred in the past 30 years ( project file – fire/fuels). These were suppressed immediately and did not affect forest characteristics.

Vegetation conditions in the Wrenco Project area have similarities to conditions described in the Columbia River Basin Assessment, Northern Region Overview, and Pend Oreille Subbasin Assessment. The historic stand composition has changed dramatically from pine and larch dominated to Douglas-fir dominated stands. The structure of the stands is primarily immature/medium-size timber with little diversity.

## Habitat Types

Forest vegetation in northern Idaho and in the Wrenco Loop project area is shaped by several complex physical and environmental factors. To simplify the measurement of some of these physical and environmental factors, a classification system called habitat typing is used. Habitat types (Cooper et al. 1991) are a classification used to reflect the relationship between climate, site, and potential vegetation species. There are five habitat types noted within the stands of the analysis area. A map of these stands is included in figure 3-2 (map packet).

Habitat type groups are aggregates of habitat types and are used for areas of similar natural disturbance regimes, successional patterns, and structural characteristics (R-1 Landscape Ecology Peer Group Biophysical Classification 1995, and Smith and Fisher 1997). These groups are based on mature stand structure and not climax forest structures, unlike habitat types themselves. The five habitat types in the analysis area are included in either the moderately warm and dry or the moderately cool and moist habitat type group. To allow comparison to information for the Pend Oreille subbasin, these habitat type groups are included and referred to as dry and moist. The moderately warm and dry group falls within the mid-range of those groups in the dry category and the moderately cool and moist group is within the midrange of those groups in the moist category.

It is important to recognize that there are inclusions of dry habitat within moist habitat descriptions. These dry areas would be treated as such with the understanding that the overall habitat type is described as moist.

## Forest Cover Type, Structure and Pattern

**Cover Type (Existing Dominant Trees) –** Forest cover types describe the tree species that dominate a particular site. These cover types were used to describe the existing and historical forest composition (from the TSMRS database).

Compared to the historical situation, the Pend Oreille subbasin and the Wrenco Loop project area have experienced a major decline in forest stands historically dominated by western white pine, western larch and ponderosa pine, and a corresponding increase in grand fir, western hemlock, Douglas-fir and lodgepole pine.

**Structure –** Historically in drier habitat types of the Pend Oreille subbasin and in the Wrenco Loop project area, short-interval, underburning fires maintained many of the stand structures as large, open-grown ponderosa pine, western larch and Douglas-fir. It is estimated that over 40 percent of these habitats over the landscape consisted of open-grown, mature, and old-growth structures, with lesser amounts in the early succession and immature forest structures.

In moister habitat types, both white pine and western larch made up a high percentage of the species composition. Over large landscapes, approximately one quarter was in the early successional stage and less than one quarter was in the old-growth stage of stand development. The remaining acreage was in the pole, immature and mature stand structures because lethal (stand-replacing) and mixed-severity fires were common in moister habitat types.

In many cases, the old growth existing today is different from old growth stands of the past. Large old white pine is no longer present and western larch has been reduced significantly. Today, the existing old growth stands in moist habitats of the Pend Oreille subbasin are primarily cedar, hemlock, and grand fir stands. In the Wrenco Loop project area, the majority of the immature forest is nearing mature forest structure. Due to the shift from potentially long-lived species such as western larch, ponderosa pine and white pine (Fins, Byler et al. 2001, USDA

Forest Service 1971, Fiedler and Loyd 1992, Arno 1996) to the shorter-lived Douglas-fir (USDA Forest Service unpublished report, Rockwell 1917), much of the immature and mature forest structures will not reach old growth conditions due to the susceptibility of these trees to insect and disease.

Table 3-2 displays the current and historic cover types and structures in the Pend Oreille subbasin and the Wrenco Loop analysis area. The vegetation analysis area is for National Forest lands only. The existing condition information represents the cumulative effects of past disturbances and present activities including past fires, past harvest, fire suppression, disease and insect attack, and vegetation growth to the present.

**Table 3-2. Comparison of stand characteristics as percent of acres***

| Cover Type | Historic Pend Oreille Subbasin | | Existing Pend Oreille Subbasin | | Existing Wrenco Loop Analysis Area (1,007 acres) |
|---|---|---|---|---|---|
| PP, WP, or WL | 55 | | 8 | | 7 |
| GF, DF, H, C, LP, | 45 | | 92 | | 93 |
| **Structure** | **Size** | **Age in Years** | **Historic Pend Oreille Subbasin** | **Existing Pend Oreille Subbasin** | **Existing Wrenco Loop Analysis Area (1,007 acres)** |
| Shrub/Seedling /Sapling (early succession) | 0-5” | | 23 | 28 | 0 |
| Pole/Small | 5-8” | | 13 | 4 | 0 |
| Immature/ Medium | > 8” | <100 | 23 | 39 | 96 |
| Mature/Large | 9-21+ | >100 | 21 | 21 | 4 |
| Old Growth | >21 | All >150 | 19 | 7 | 0 |

*Percents are calculated for the stand level. There may be individual acres within stands that have different cover types and structure which are not reflected in the percentages.
PP=ponderosa pine, WP=white pine, WL=western larch, GF=grand fir, DF=Douglas-fir, H=hemlock, C=cedar, LP=lodgepole pine,

Table 3-3 shows the various existing forest characteristics for each stand in the project area (refer to figure 3-2 in the map packet for stand location). Douglas-fir is the most abundant cover type in the project area, occurring in all but two stands, and the immature forest structure is found in all but one stand.

Unlike historic conditions, there have been no fires affecting forest vegetation within the last 80 years or more. Root disease is causing mortality in some areas dominated by Douglas-fir and beginning to change the structure of some stands. Overly dense patches of immature trees are beginning to thin from competition or breakage caused by wind and snow. Trees in these dense patches are contributing to an increasing fuel load in the analysis area. Trees damaged by wind and snow are also providing habitat for tree-killing insects.

**Old Growth** – In our reviews of the Wrenco analysis area, stand 643-04-044, designated as mature, with an exam showing 1818 as a date of origin was questionable for old growth consideration. All other stands are immature and originate following the 1926 fire. This stand was reviewed with an intensive old growth exam in 2004 and found to be lacking in the number of large old trees to meet old growth standards (it has only two large old trees per acre). The vast majority of the trees in this stand, as well as other stands, originated after the 1926 fire. No stands are considered old growth in the Wrenco Loop project area (see Appendix C and Vegetation project file-Old Growth Review).

Within the Wrenco analysis area, stands or portions of stands that are proposed for regeneration cutting are not expected to trend toward old growth structures due to mortality presently occurring or expected to occur. Some stands prescribed for thinning have the potential for trending toward large-diameter, long-lived seral trees. These stands have the possibility of reaching old-growth structure in the future. In addition, other stands with long-lived species (example: cedar in riparian areas), which are not proposed for cutting, may reach old-growth structures if disturbance does not trend them back toward early succession.

**Table 3-3. Existing forest characteristics by forest stand**

| Stand | Acres | Habitat Type[1] | Habitat Type Group | Cover Type[2] | Structure[3] |
|---|---|---|---|---|---|
| 643-04-001 | 11 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-005 | 58 | PSME/SYAL | Moderately Warm & Dry | Douglas-fir | Immature |
| 643-04-008 | 36 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-010 | 220 | TSHE/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-011 | 73 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-013 | 31 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-044 | 36 | PSME/PHMA | Moderately Warm & Dry | Douglas-fir | Mature |
| 643-04-045 | 8 | PSME/PHMA | Moderately Warm & Dry | Douglas-fir | Immature |
| 643-04-046 | 23 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-047 | 155 | TSHE/ASCA | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-048 | 31 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-049 | 110 | PSME/PHMA | Moderately Warm & Dry | Douglas-fir | Immature |
| 643-04-050 | 35 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-051 | 32 | PSME/PHMA | Moderately Warm & Dry | Douglas-fir | Immature |
| 643-04-052 | 48 | THPL/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-053 | 34 | TSHE/CLUN | Moderately Cool and Moist | Douglas-fir | Immature |
| 643-04-054 | 46 | TSHE/CLUN | Moderately Cool and Moist | Larch | Immature |
| 643-04-057 | 23 | TSHE/CLUN | Moderately Cool and Moist | Larch | Immature |

1 Habitat Types: THPL=*Thuja plicata*; PSME= *Pseudotsuga menziesii*; TSHE= *Tsuga heterophylla* CLUN= *Clintonia uniflora*; SYAL= *Symphoricarpos albus*; PHMA= *Physocarpus malvaceus*; ASCA= *Asarum caudatum* *Symphoracarpus albus*; PHMA= *Physocarpus malvaceus*; ASCA= *Asarium caudatum*

2 Composition: Cover type from stand exam files (R-1 Edit, TSMRS).

3 Structure: Determined by size/age class from stand exam files (R-1 Edit, TSMRS).

**Landscape Pattern** – Natural disturbances such as fires and disease have historically fragmented landscapes of northwest forests. The variability of frequency and severity of fires produced conditions in which some forests were dominated by small habitat patches while others were characterized by larger forest patches (Rochelle 1998).

Historic fire regimes (large stand-replacing fires at long intervals with smaller fires in the interim) tended to create large areas of similar stand structure. Immediately following disturbance, shrubs and seedlings would dominate these large areas. As trees in these areas grew through the various structural stages, minor disturbances would alter stand structure on a smaller scale. Some watersheds would be composed mainly of old forest structural stage with "islands" of younger age classes where small-scale disturbances occurred. Other watersheds would consist mainly of younger age classes with "islands" of mature and old structural stages that survived the large stand-replacing fires.

Since the late 1800s, timber harvesting and fire suppression have replaced natural disturbance as the primary forces shaping forest landscapes in northwest forests. Perhaps the most important consequence of timber harvesting has been the significant reduction in amounts of old growth on private land and its high degree of fragmentation on federal lands. Fire suppression over the last several decades is also altering natural disturbance patterns and is generally recognized to be "defragmenting" some northwest forests (Rochelle 1998).

In the Pend Oreille subbasin, large areas of mature and old growth timber are lacking, although the total amount of mature forest hasn't changed much from historic levels. Mature forest now tends to occur in long narrow stringers with more edge. There are large areas of immature/medium-sized timber that resulted from the high-intensity stand-replacing fires in the early 1900s and the effects of subsequent fire suppression (Monitoring Report, USDA Forest Service 2003 pgs. 100-103). These areas are now homogeneous, single-aged, single-storied stands. The Wrenco Loop analysis area is one of these areas.

## Conclusions

Based on a comparison of historic and present conditions across the Wrenco Loop project area, the following conclusions were made:

- Disturbance and forest succession processes have been altered since European settlement in northern Idaho.
- With the introduction of blister rust, the suppression of wildfires, and past timber harvesting, the character of the forest has changed. Across the project area, there has been a reduction in the percent of the landscape composed of long-lived tree species such as western white pine, ponderosa pine and western larch, and an increase in Douglas-fir and grand fir. These latter species are more vulnerable to disturbances such as insects, diseases, and fires. They are less adapted to disturbance such as fire and to natural climatic variability than the species they replaced. The results are more insect and disease activity and higher fire risk.
- The decline in white pine, western larch, and ponderosa pine has led to a forest that lacks variety in tree species. Because some species are present in small quantities and in some areas are not present at all, they are less likely to reseed themselves through natural regeneration.
- Across the project area, there has been a shift in forest structure from early succession and old growth to immature size-class stands. This is primarily the result of past harvesting of big old trees, stand-replacing fires, and subsequent fire suppression activities. There is no anticipated large-scale increase in old growth on much of the landscape due to the shift from long-lived

tree species to Douglas-fir, which is generally a shorter-lived species in this area. Currently, none of the Wrenco Loop project area contains old growth stands (see Appendix C and project file – vegetation section). Across the Forest, the Idaho Panhandle National Forests meets the requirements of greater than 10% old growth (Monitoring Report, USDA Forest Service 2003a, pp. 89-93).

- Across the project area, there is a moderate level of root disease and Douglas-fir beetle activity due to the increase of Douglas-fir within the watershed and the size, density, and age of the Douglas-fir present.
- Across the project area, there is a long-term loss of timber productivity as species composition has changed from white pine, western larch, and ponderosa pine to Douglas-fir. The loss of timber productivity on these areas does not meet the intent of the Forest Plan.
- Across the project area, there is an increased risk of severe, stand-replacing fire on dry habitat type groups due to fuel accumulations from the past exclusion of fires.

### Recommendations

The above conclusions support the following recommendations for the Wrenco Loop project area. The recommendations are listed in order of priority.

1. In stands where they are present, promote the maintenance of potentially long-lived, early-seral tree species such as ponderosa pine, western larch, and western white pine through thinning, improvement cutting, and underburning where possible.
2. Restore desired potentially long-lived early seral tree species through regeneration cutting and planting in areas where shorter-lived, early-seral species (e.g. Douglas-fir) have high mortality or are at risk of high mortality.
3. Using methods such as cutting and prescribed fire, reduce fuel levels to decrease the risk of a large, stand-replacing fire in the watershed and reduce the risk of destruction by fire to private property.

## *Environmental Consequences*

### Analysis Process

Existing conditions of forest vegetation in the Wrenco Loop Area are described in the Affected Environment section and provide a baseline of vegetation conditions to compare differences in environmental effects between alternatives.

Direct and indirect effects of cutting activities were measured by analyzing changes to species composition, stand structure, and pattern. The information used for landscape pattern analysis was developed using the FRAGSTATS model (McGarigal and Marks 1995) and was used to compare the alternatives to existing conditions. FRAGSTATS is a spatial pattern analysis program for quantifying landscape structure.

The time frame for the estimated direct and indirect effects analysis of all alternatives is 10 years. Some discussion refers to the general progression of structural stages over time, which could occur over a span of 200 years.

The current or existing condition information (referenced in the Affected Environment section) represents the cumulative effects of past disturbances and present activities including past

harvest, fire suppression, disease and insect attack, and vegetation growth to the present. Past harvesting in the project area was mainly in the form of salvage logging the scattered large diameter trees after the fire in 1926. We can only assume that the trees removed were large relics that survived the fire. These trees were likely scattered across the landscape and the removal of these did not have an effect on the cover type or structure that we see today. There may have been more scattered snags on the landscape than currently; however, structure or cover type was probably not affected by timber harvests after the 1926 fire.

Table 3-4 shows the predicted percent of the analysis area for stand cover type and structure under each of the alternatives. The changes were calculated for National Forest lands only. An explanation for this can be found in the Analysis Area section in the beginning of the Forest Health section.

**Table 3-4. Predicted changes in vegetation cover type and structure as percent of analysis acres***

| Stand Parameter | Alternative A Wrenco Loop Analysis Area; 1007 acres | Alternative B Wrenco Loop Analysis Area; 1007 acres |
|---|---|---|
| **Cover Type** | | |
| PP, WWP,or WL | 17 | 7 |
| DF,GF, H, C, LP, | 83 | 93 |
| **Structure** | | |
| Shrub/Seedling/Sapling (Early Succession) | 8 | 0 |
| Pole/Small | 0 | 0 |
| Immature/Medium | 88 | 96 |
| Mature/Large | 4 | 4 |
| Old Growth | 0 | 0 |

*Percents are calculated for the stand level. There may be individual acres within stands that have different cover types and structure which are not reflected in the percentages.

PP=ponderosa pine, WP=white pine, WL=western larch, GF=grand fir, DF=Douglas-fir, H=hemlock, C=cedar, LP=lodgepole pine

## Direct and Indirect Effects

### *Alternative A – Proposed Action*

Table 3-5 displays each stand within the project area proposed for treatment along with acres within each treatment type.

In treatment areas I and II, which incorporate primarily thinning and improvement cutting (types of selective cutting) the proposed action would have an effect on species composition by reducing the amount of trees that are Douglas-fir, grand fir, hemlock, cedar and lodgepole pine. This reduction generally would not be enough to cause a change to the overall cover type of the stand. The single exception is stand 64304049, where the application of the Area I prescription on a dry site stand would change the cover type from Douglas-fir to ponderosa pine.

While the actual cover type would not change for most stands, the relative abundance and health of the desired tree species would increase. Therefore, the biggest effect of thinning and

improvement cutting would be to increase the composition of desired species and to increase the diameter and crowns of trees in the remaining stand, thus prolonging the presence of these trees over time. Also in treatment areas I and II, up to ten percent of these two areas (53 acres) could end up as three- to five-acre openings. These small openings would be planted with ponderosa pine on dry sites, and white pine and western larch on moist sites. The structure and composition of species in the small openings would change but would not affect the overall structure or cover type of the stand, because they are such a small portion of the overall area.

In treatment area III, the prescription calls for regeneration cutting. This type of cutting would leave an open stand condition, allowing for enough sunlight and growing space for desired tree species to establish and dominate. On an estimated 58 acres of existing Douglas-fir cover type, regeneration cutting would result in new stand(s) with a change in cover type to western larch and ponderosa pine. One stand (6340454) currently has western larch as the cover type; approximately 24 acres of this stand would be harvested using regeneration cutting and would retain its cover type.

**Table 3-5. Alternative A: Stands and treatment acres**

| Stand | Stand Acres | Area I | Area II | Area III | Total Treatment Acres |
|---|---|---|---|---|---|
| 643-04-005 | 58 | 20 | | 4 | 24 |
| 643-04-008 | 36 | 9 | | | 9 |
| 643-04-010 | 220 | 26 | 151 | 10 | 187 |
| 643-04-011 | 73 | 13 | 45 | | 58 |
| 643-04-013 | 31 | 7 | | | 7 |
| 643-04-044 | 36 | 18 | 4 | 1 | 23 |
| 643-04-045 | 8 | 1 | | | 1 |
| 643-04-046 | 23 | 14 | 2 | | 16 |
| 643-04-047 | 155 | 58 | 20 | | 78 |
| 643-04-048 | 31 | 12 | | 3 | 15 |
| 643-04-049 | 110 | 41 | 2 | 25 | 68 |
| 643-04-050 | 35 | | 21 | | 21 |
| 643-04-051 | 32 | 28 | 1 | | 29 |
| 643-04-052 | 48 | 18 | 2 | 16 | 36 |
| 643-04-053 | 34 | | 1 | | 1 |
| 643-04-054 | 46 | 4 | 8 | 24 | 36 |
| 643-04-057 | 23 | 0 | 3 | | 3 |
| Total | 999 | | | | 612 |

In some areas, selective cutting would enhance the health and promote desired species on dry- and moist-site, immature forest stands, some of which could become old growth in time.

In many stands with a high composition of Douglas-fir, the potential for future old growth would be limited as root disease would eventually kill susceptible species (USDA Forest Service

unpublished report, Rockwell 1917). However, planting root disease resistant ponderosa pine, white pine, and western larch would likely increase the acreage of potentially long-lived, seral old growth in the long run, which is currently lacking (Fins, Byler et al. 2001, USDA Forest Service 1971, Fiedler and Loyd 1992, Arno 1996)

In treatment area III the prescription calls for irregular shelterwood. This would result in a change in structure from immature to early succession (shrub/seedling/sapling structural stage). Converting immature forest structure to the early succession stage of stand development would increase the early succession average patch size while reducing those patch sizes related to immature (project file – vegetation section). These changes are greater than what would occur under the No Action alternative. The stands would not move back into the immature structure in the 10-year long-term effects analysis period.

### *Alternative B – No Action*

Overall forest cover type would not change in the next 10 years under the No Action Alternative. Stand composition of Douglas-fir and grand fir would continue to increase in relative abundance, with pine and larch decreasing over time. In the long term (more than 10 years), the cover type on the two stands that are currently larch would likely become dominated by Douglas-fir and grand fir as well, due to a decrease in stand conditions favorable to western larch.

Barring large disturbances such as fire, storm damage or insect epidemic, forest structural classes are estimated to remain the same in the next 10 years as a result of no action. Mortality would continue throughout the stands along with some growth on remaining trees. Mortality in root disease areas would continue to “open up” these areas as the majority of large Douglas-fir are killed and the sites revert to early succession Douglas-fir.

## Cumulative Effects

Cumulative effects analysis includes disclosure of the potential additive effects of past, present and reasonably foreseeable activities combined with the effects of the proposed action on federal and nonfederal lands. The cumulative effects analysis area boundary is defined by where the effects are no longer apparent. For the reasons discussed below, the cumulative effects analysis boundary is the same as the vegetation analysis area boundary.

**Wrenco Loop Vegetation Analysis Area** – Past activities and natural processes, which have created the existing vegetation conditions, are described in the Affected Environment section. Natural processes such as insect and disease induced mortality are discussed as reasonably foreseeable influences on vegetation change.

Ongoing activities identified in table 3-1 that may cumulatively affect forest vegetation include fire suppression and post and pole permits. Without further intervention, fire suppression would continue to allow understory trees (nearly always shade-tolerant) to proliferate and add to the current condition. Post and pole permits do not cover enough area to have an effect on the overall structure or composition of the stands within the project area.

Although the cumulative effects analysis area is limited to the National Forest lands within the project area, each project that is carried out with the objectives of restoring forests toward their historic range described in the Scientific Findings of the Interior Columbia Basin Ecosystem Management Project, Northern Region Overview, and Pend Oreille Subbasin Geographic Assessment would contribute to a trend towards restoring historic forest composition and structure. The proposed treatments would move a few acres of both dry and moist site stands towards those conditions found historically on these sites. Without treatment, all stands would

continue to develop along successional pathways that are outside the historic averages for the sites in the area. In this context, the area would continue to contribute to the imbalance between historic and existing forest composition at the subbasin scale.

**Old Growth** – The Wrenco Loop project area is in old growth management unit (OGMU) 22. Allocated old growth in this OGMU includes 454 acres, which is 7.7 percent of the 5,890 acres of federal lands within OGMU 22. This meets the minimum five percent standard.

Since there is no old growth in the Wrenco Loop project area, neither the 5% minimum nor the 10% Forest-wide standard would be affected by either of the alternatives. (see Appendix C and the map of OGMU #22 in the Vegetation section of the project file).

**National Forest Lands Outside the Project Area** – In the contiguous portion of National Forest lands outside the project area boundary (approximately 160 acres) to the northeast there are no significant past, current, or reasonably foreseeable activities other than fire suppression that would lead to cumulative effects with the proposed action.

**Private Lands Outside the Project Area** – As described in Chapter I, private land activities in the Wrenco Loop area, such as urban development and logging, are continually modifying the landscape in private ownership. From a vegetation standpoint, only a small percentage of private lands are trending toward the desired forest cover types of larch, white pine, and ponderosa pine, as some landowners manage for these species. Most private landowners are not making the investments to manage this direction. No significant increase in late mature structures or old growth is expected on private lands, and fragmentation is expected to continue with smaller patch sizes, more edge effect and less core area. It is predicted that historic ranges of variability in vegetation would not be restored on a landscape scale. For these reasons, effects of proposed vegetation treatments in Alternative A are expected to be localized and therefore, would not have cumulative effects. For these reasons the cumulative effects analysis boundary is the same as the vegetation analysis area boundary (see project file for private land activities).

**Fire Suppression** – Under Alternative B (No Action), successful fire suppression would continue advancing stands with a tendency toward shade-tolerant species. The existing long-lived seral species would tend to be shaded out and replaced by species such as grand fir on more moist sites and Douglas-fir on dry sties. The forest cover types across the landscape would not change significantly from what they are now although a few stands would continue to change from ponderosa pine and western larch to Douglas-fir or grand fir. In many areas with predominantly Douglas-fir mortality would increase and stands would change from mature and immature structures to shrub and seedling/sapling stands of predominantly grand fir and Douglas-fir. As stands of Douglas-fir die, larger patches of seedling/sapling would occur.

Under Alternative A, successful fire suppression would continue advancing *untreated stands* in the same direction as Alternative B. In treated stands, fire suppression may reduce the risk of losing desired early seral species by reducing unwanted fires. Treated stands would have a much higher opportunity for control and suppression of unwanted fires (see Fire and Fuels section).

## Consistency with Forest Plan and Other Laws and Regulations

Alternative A is consistent with Idaho Panhandle National Forests Forest Plan direction (USDA Forest Service 1987). The specific standards, with their location in the Forest Plan, are referenced below in parentheses.

Both even-aged and uneven-aged silvicultural systems were considered for areas proposed for harvest. On the Sandpoint Ranger District, it was determined that both systems were appropriate where regeneration harvests were proposed (Timber Standard 1, page II-31).

Regeneration harvests are proposed for stands in which mortality is either high or expected to be high in the near future, and where species that are not desired are occupying the growing space. Site preparation and fuels reduction activities are proposed to provide appropriate sites for planting. Following site preparation, usually underburning, regenerated stands would be planted with seral species (white pine, larch, and ponderosa pine) to promote stand structures and species composition that reduce susceptibility to insect and disease. This is consistent with Forest Plan direction that "reforestation would feature seral tree species". All stands proposed for regeneration harvest are on lands suitable for timber production and can be adequately restocked within five years of the final harvest. As directed by the Forest Plan, stands would be regenerated with trees from seed that is well adapted to the specific site conditions, and would be regenerated with a variety of species (Timber Standard 4 and 5, p. II-32).

Site-specific silvicultural prescriptions are compatible with management area goals, and preferred species management has considered both biological and economic criteria (Timber Standard 9, page II-32). Silvicultural practices including harvest, site preparation and planting with seral species are designed to reduce the perpetuation of pest problems (Forest Protection Standards 1 and 2, pp. II-37 and II-38).

Management of competing understory vegetation would be accomplished, where necessary, as a consequence of fuels reduction/site preparation treatments (Forest Protection Standard 3, p. II-38).

Alternatives A and B meet Forest Plan Standards for old growth, see Appendix C for further explanation.

Alternative B would not be consistent with Forest Plan objectives for promoting stand structures and species mix, which reduce susceptibility to insects and diseases (p. II-32, (4)).

# Fire Suppression

## *Introduction*

When the proposed management activities were presented to the public during the Scoping Process in November 1995, December 1996 and November 2002, concerns were raised about the proposed activities causing an unwanted wildland fire to spread from National Forest land onto the adjacent State of Idaho and private lands. The State of Idaho lands are managed as commercial timberlands, and much of the other private ownership is part of the "Wildland-Urban Interface", with homes and other improvements built in a forested setting.

Fire prevention and suppression for National Forest land in the Wrenco Loop project, and the adjacent State and private lands, is the responsibility of the Idaho Department of Lands. Since the early 1920s, when fire suppression organizations were formed at the federal and state levels, the objective has been to suppress all human- and lightning-caused wildfires as soon as possible, at the smallest possible size. These efforts have been largely successful over the past 80+ years, but have resulted in a transition from a forest that was fire-dependent into timber stands that have evolved in fire's absence. Although these fire-intolerant stands have survived for many years, they present an unnatural accumulation of fuels that, under extreme fire weather condition, could

result in high-intensity wildfires that could escape the National Forest lands if the stands are allowed to continue to progress towards a climax stand condition.

The risk of fires originating from the proposed timber harvest activities includes human-caused fires from smoking, warming fires, vehicle exhaust systems, and logging equipment operations. During the fuels treatment portions of the proposed action, risks again include the human-caused fires just described, as well as fires caused by escaped prescribed underburning and pile burning.

## Regulatory Framework

A goal of the Forest Plan for the Idaho Panhandle National Forests (USDA Forest Service 1987) is to provide efficient fire protection and fire use to help accomplish land management objectives. Current direction is to suppress all unplanned fires (natural and human-caused) in the project area. Planned ignitions of prescribed fires are allowed.

The proposed activities in the Wrenco Loop project area are not listed as priority projects under the National Fire Plan.

## Analysis Methods

The predicted effects of the proposed management activities on the ability to suppress unwanted wildland fires in the project area are based upon projections of future stand conditions and fuel loadings and comparable conditions in similar vegetation types. Fire spread rates and intensities were estimated using BEHAVE Plus, an interactive computer model designed to predict fire behavior characteristics for various fuel types.

### Analysis Area

The analysis area consists of the National Forest lands within the defined project area. While the public (as expressed in the Scoping Process) is concerned about fires that result from the proposed management activities spreading onto the adjacent private lands, the Forest Service is equally concerned that the successional changes occurring within the timber stands could result in more severe fuel conditions of untreated stands. Such conditions would reduce the effectiveness of fire suppression efforts should a fire start on the National Forest lands, increasing the risk of fire spreading onto private and State lands. While it is not necessary to fully consider the stand conditions on these adjacent lands as part of this project analysis, they are part of the area's fuel complex that suppression forces must deal with in formulating suppression strategies and tactics for wildland fires that occur in the area. The Wrenco Loop project area is the appropriate cumulative effects analysis area because it will be affected by fires that burn into it from adjacent areas or from fires that originate from within the project boundaries and onto the adjacent lands. The fire behavior characteristics (fire intensity, flame lengths, rate of spread) will be directly affected by the presence and/or absence of the proposed actions (timber harvest and fuels treatment).

Should an unwanted wildfire ignition occur under extreme fire weather conditions either inside the project area, or on adjacent private and/or State lands the area affected by such an ignition could potentially affect a significantly larger area, similar to the area impacted by the Sundance Fire in 1967.

## Affected Environment

The key components affecting the ability to suppress unwanted wildland fires in the Wrenco Loop project area (aside from the types and availability of suppression resources) include weather, terrain, and fuels.

**Terrain** in the project area consists of easterly and southerly facing aspects, on slopes ranging from 20-50%. Existing vegetation is strongly influenced by both the terrain (aspect), and the moisture regimes it influences.

**Weather** in the immediate project area is not well documented, since the area is an isolated piece of National Forest land that does not have a dedicated weather station. However, there is an extensive volume of weather records from the nearby Priest River Experimental Forest that gives an indication of the relatively short- term (1930 –1980) weather ranges that occur in the area (Finklin 1983). These weather records, which are expanded to include temperature and relative humidity extremes that occurred in fire seasons from 1912 – 1982, show the potential for conditions (temperatures at 103°F, relative humidity of five percent) that, if they occur together with a fire ignition, have the potential to result in a large, high-intensity wildfire. The *Sundance fire* (1967), burned under extreme weather conditions that allowed it to cover nearly 50,000 acres in nine hours, induced by the passage of a dry, upper-level trough (Pyne 1982). The effects of weather on the project area and the surrounding forests of Northern Idaho, especially long-term drought, is best shown by the fires of 1910 that burned across the area (Pyne 2001).

**Fuels** in the Wrenco Loop project area are typical of those found in similar areas throughout the moister areas of northern Idaho, northeastern Washington, and western Montana. The annual precipitation of these areas, which is significantly higher than much of the interior west, results in forests which are highly productive, and also produce high levels of organic materials. The naturally occurring fuel conditions on the drier, south-facing slopes that would exist in the absence of fire suppression would show mixed, open stands of ponderosa pine, larch, and Douglas-fir, with little understory vegetation or accumulated dead and down materials. On the moister east facing slopes, a mosaic pattern resulting from moderately frequent, variable intensity fires and infrequent high-intensity fires would find multi-storied timber stands, with an accumulation of ground fuels. The lethal, stand-replacement fires typically averaged 150-250 years apart on these sites. Because of the fire suppression efforts during the past century, such natural fire regimes do not exist today in northern Idaho, and specifically in the Pend Oreille subbasin area, where fire had been the most significant historic natural disturbance event affecting the vegetation.

The fuel conditions that exist today, prior to the proposed management activities, are substantially different from the natural conditions described above: the drier sites now have a denser tree cover, with a higher component of Douglas-fir and grand fir, with understories of dense shrubs and shade-tolerant tree reproduction. Under more severe fire weather conditions, these areas will be more likely subject to high-intensity fires, with the accumulated ground fuels providing the heat to ignite smaller trees, which will act as ladder fuels to carry the fire into the crowns of the mature overstory (Gruell 1983).

Another factor that will influence fire management activities in the Wrenco Loop project area is access. The existing road system provides limited access for fire suppression equipment in the case of an unwanted ignition, but conversely limits public access to the area that might result in human-caused fires in the area. Some access into the area currently occurs, either by hikers on foot, or by off-road machines such as ATVs. These uses pose some risks during periods of high fire danger, but have not manifested themselves in recent years.

## *Environmental Consequences*

### Direct and Indirect Effects Common to Both Alternatives

Since the major fire in 1926 and the timber harvest associated with that event, vegetation in the Wrenco Loop project area has become more shade-tolerant, multi-storied, and susceptible to high-intensity, stand-replacement fires. Under either alternative, there would be changes in the density of the canopy, the type, amount, and arrangement of the fuels, and the species of the vegetation on the site.

These changes and the resultant fire behavior would result in different flame lengths, fire intensities, rates of spread, and resistance to control than what now exist in the Wrenco Loop area. The effects on the residual vegetation would vary, depending whether the natural progression to a shade-tolerant stand composition is allowed to continue, or if management activities move the vegetation toward more fire-tolerant stand species.

### Direct and Indirect Effects of Alternatives

#### *Alternative A – Proposed Action*

The proposed action allows for the removal of fire-intolerant species and the treatment of activity-generated fuels that would reduce the fuel loading to levels that permit unwanted wildfire ignitions to be suppressed by initial attack forces. The fuel treatment and site preparation work would entail:

- Grapple piling and burning those piles, both on ground gentle enough (less than 35 percent) to allow mechanized machinery to work safely, as well on areas adjacent to the National Forest boundaries.
- Prescribed underburning on areas internal to the National Forest boundary, and adjacent to areas that will be grapple piled. Prescribed underburning would occur after the adjacent areas have been grapple piled.
- Access for fire suppression resources would be enhanced by new road construction, and improved maintenance of existing roads in the project area.

The effects of these actions will be to modify the woody fuel profile from a National Forest Fire Lab (NFFL) Fuel Model 10 (timber, litter, and understory), to a NFFL Fuel Model 2 (timber, grass and understory) (Anderson 1982). The resultant fire behavior, as modeled in BEHAVE, will display flame lengths of less than two feet as opposed to flame lengths of greater than four feet in fuel model 10. Flame lengths of less than two feet, coupled with rates of spread at two chains (132 feet) per hour, are within the range where direct attack by hand crews is reasonable and effective under most conditions. Flames lengths exhibited by fuel model 10, coupled with rates of spread of 7-10 chains per hour (462-660 feet per hour), are generally considered to be unsafe for direct attack by firefighters in woody fuels types (NWCG 2004). There is a high likelihood (>90%) that any fire starting in the project area would be suppressed by initial attack and/or extended attack forces given the additional access through new road construction, and would not escape onto adjacent private and State lands. Fires that start on the adjacent private or State lands, and subsequently burn onto the National Forest lands within the project area, would burn with flame lengths and rates of spread that allow fire suppression forces to take direct control actions.

### *Alternative B – No Action*

This alternative would result in a continued buildup of naturally occurring fuels, both live and dead. The ingrowth of shade-tolerant tree species would continue at the seedling/sapling/pole sizes, adding to the fuel ladder that could take fire into the crowns of the larger trees. In addition, the older trees would continue to lose vigor and/or die out, contributing to the ground fuels. As has been the pattern on sites being taken over by shade-tolerant species, mixed-severity fires would continue to burn; most fires would be at low to moderate intensities and size, creating small pockets within the overall stand structure. On an infrequent basis, when long-term drought or extreme weather conditions are coupled with a fire ignition, larger, stand-replacement fires could burn within the project area and beyond, onto adjacent State and private lands.

No change in the road access situation would result. Initial-attack-fire-suppression resources would not improve the effectiveness or efficiency of their response times. Fire suppression efforts would be the same as those described under Alternative A for Fuel Model 10: flame lengths and rates of spread that exceed safe limits for direct attack by hand fire crews. Under those circumstances, motorized and mechanized equipment would be required, often taking more time to reach the fire scene, thereby allowing the fire to grow larger, with the potential to escape initial attack. Fires beginning on the National Forest lands within the project area have an increased likelihood of escaping initial and extended attack, and spreading onto the adjacent private and State lands; the presence of ladder fuels also increases the possibility of fires moving from the surface fuels into the crowns of the overstory conifers, resulting in high mortality levels in the fire-intolerant species. Fires beginning on the private and State lands adjacent to the project area would also spread rapidly when they encroach on National forest lands, exceeding the capability of hand crews to stop their spread, and having the potential under favorable weather and burning conditions to move into the crowns.

## Cumulative Effects

### *Cumulative Effects Common to Both Alternatives*

The cumulative effects area for all of the fire-related effects analysis for the Wrenco Loop project area encompasses both the National Forest lands and the adjacent private and State lands that would be impacted by fires burning out of, or into, the designated project area. These areas are not defined on a map, since the final size and location of any single fire is determined by factors that can be highly variable (wind speed and direction, fuel moisture levels, fuel loadings by size class, etc). The 1910 northern Idaho fires and the Sundance fire of 1967 can be viewed as “worst-case” scenarios for fire size and impacts in the project area and adjacent lands (Pyne 1982, 2001). The activities on the adjacent private and State lands (timber harvest, residential construction, firewood cutting, recreation activities, etc.) are expected to continue, and may cause a wildfire impact within the project area.

### *Alternative A – Proposed Action*

Since the major fire in 1926 and the timber harvests associated with that event (removal of larger fire resistant serial species), vegetation in the Wrenco Loop project area has become more shade-tolerant, multi-storied, and susceptible to high-intensity, stand-replacement fires. Changing the stand composition by timber harvest, and then treating the naturally occurring and activity-generated fuels by grapple piling and prescribed underburning, would have the effect of setting the area to a stage in the successional cycle with more fire-tolerant species and less ground fuels. The result would be a significant reduction in the fire intensity and ladder fuels, which would in turn lower the risk of a stand-replacement fire under extreme fire weather conditions within the

project area. Because of the reduced risk of high-intensity, stand-replacing fires, other resources dependent on vegetation patterns more reminiscent of the early 1900s would be more likely to be sustained and would flourish. The opportunity to effectively and efficiently manage forest fuels to prevent wildfire escapes onto adjacent State and private lands would be enhanced. Lower ground-fuel loading, together with elimination of most ladder fuels, will allow the reintroduction of prescribed underburning on a periodic basis without the risk of unacceptable damage to the residual stand, or escapes outside the planned burn areas. It would also allow ground firefighting forces to use direct attack tactics under most circumstances (Carlton 2001). Firefighter road access would improve into some portions of the project area, resulting in an increase in firefighting efficiency.

### *Alternative B – No Action*

Taking no actions in the Wrenco Loop project area would allow the continued transition of the vegetation towards shade-tolerant, fire-intolerant species, with the associated fuels buildup which has been happening since the 1926 fire and subsequent timber harvests. The area would be more susceptible to high-intensity, stand-replacement fires because of the ground fuel loading and the ladder fuels associated with mixed-species, multi-storied stands. Fire originating in the Wrenco Loop project area would have an increased likelihood of exceeding the suppression capability of the planned initial attack resources, and may result in fires escaping the National Forest boundaries and moving onto adjacent State and/or private lands. Road access for firefighting would remain at the current level.

## *Consistency with Forest Plan and Other Laws and Regulations*

The goal of the Idaho Panhandle National Forests is to provide efficient fire protection and fire use to help accomplish land management objectives. The Forest Plan standards for fire management, 2a through 2g, are listed on page II-38 of the Forest Plan (USDA Forest Service 1987).

**Alternative A** is consistent with the Forest Plan and would treat natural and activity-generated fuels by grapple piling and prescribed underburning, reducing the risk of catastrophic wildfires and the potential for escapes onto adjacent State and private lands. These actions would meet the standards shown above for both fire suppression and fuels treatment. The actions proposed under this alternative are also consistent with the Idaho Forest Practice Act that requires the management of slash and fuels hazards from forest management practices to reduce the risk of fire.

**Alternative B** is not consistent with the Forest Plan and would allow the continuance of natural fuel buildup, reducing the likelihood that initial attack firefighting resources could control unwanted wildfire ignitions. There would be an increasing risk of these fires escaping National Forest lands onto adjacent State and private lands. These situations described would not meet the standards shown above for both fire suppression and fuels treatment.

# Threatened, Endangered and Sensitive (TES) Plants and Forest Species of Concern

## *Regulatory Framework*

Federal legislation, regulations, policy and direction require protection of threatened, endangered and sensitive (TES) plant species, their habitat, and population viability. The regulatory framework for TES plants includes the Endangered Species Act (1973) as amended; the National Forest Management Act (1976); the National Environmental Policy Act (1969); Forest Service Manual (2672.1-2672.43); Idaho Panhandle National Forests Forest Plan (1987); and direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants (WWFRP) program and Washington Office.

## *Affected Environment*

No federally listed endangered plant species are suspected to occur in the Idaho Panhandle National Forests or in the project area (USDI 2005). Two listed threatened plant species, water howellia (*Howellia aquatilis*) and Spalding's catchfly (*Silene spaldingii*) are suspected to occur in the Idaho Panhandle National Forests (USDI 2005). Fifty-four sensitive plant species and 23 Forest species of concern are known or suspected to occur in the Kaniksu portion of the Idaho Panhandle National Forests, which encompasses the Wrenco Loop project area.

Sensitive species and Forest species of concern may be assigned to one or more habitat guilds. These guilds are artificial assemblages of species based on similar habitat requirements. A list of TES plant species by habitat guild and guild descriptions are included in the project file – rare plants section.

### Methodology

Assessment of the affected environment for TES plant species and habitat occurrence was accomplished through review of Idaho Department of Fish and Game Conservation Data Center (ICDC) Element Occurrence Records, National Wetlands Inventory maps, queries of the timber stand database (TSMRS), aerial photographs, topographical maps, and results of field surveys. A prefield review of existing vegetation information identified areas of potentially suitable habitat for TES plants; these areas were surveyed in 1991, 1994, 1995, and 2002.

*Field Survey Results*

One sensitive species, western goblin (*Botrychium montanum*), was identified in wet forest guild habitat on National Forest lands in the project area. No other rare plant species were identified. It was determined that most areas proposed for activities had low potential to support any sensitive plant species or Forest species of concern.

A small amount of suitable wet forest habitat occurs at stream crossings associated with proposed road construction. While no rare plant species were identified, these areas may support undetected individuals of sensitive moonworts (*Botrychium* species) and green bug-on-a-stick moss (*Buxbaumia viridis*).

Wetlands on National Forest lands in the project area were surveyed, but no rare plant species were identified. The wetlands have the potential to support a few sensitive species, including large Canadian St. Johnswort, which occurs in peatland habitat in the project area on private

timber industry lands. No suitable dry forest, cold forest, subalpine or deciduous riparian guild habitat was identified during the surveys. Results of the field surveys are documented on field survey forms in the project file – rare plants section.

## Threatened and Endangered Plants

**Water howellia** (*Howellia aquatilis*) occurs in seasonal ponds, glacial potholes and old river oxbows (USDA Forest Service 1994). Pond characteristics include a firm, consolidated substrate of clay and organic materials. This species requires an aquatic habitat that dries up for a portion of the year to allow for seed germination (USDA Forest Service 1994). One population of the species in north Idaho was documented in 1892 but has not been relocated (Shelly and Moseley 1988).

Potentially suitable aquatic habitat for water howellia occurs in the project area. The potential for ponds in the project area to support water howellia is considered marginal, since those ponds are characterized by the National Wetlands Inventory as having an unconsolidated bottom. This species was not observed during the field surveys. Aquatic habitats on National Forest lands that could support this species would be protected from all project activities by site-specific buffers.

**Spalding's catchfly** (*Silene spaldingii*) is suspected to occur in the Idaho Panhandle National Forests. Its habitat includes dry grasslands and grassland inclusions in ponderosa pine and Douglas-fir forest (USDI 2000a). Suitable habitat for this species is typically dominated by fescues (*Festuca spp.*) and other bunchgrasses, and often a high density of forbs. Soil depths in suitable habitat range from deep to moderately deep; soil types on which it has been found include loam, silty loam, granitic, loamy basaltic, and loess (USDI 2001b).

Spalding's catchfly typically occurs in open, dry grassland communities. While portions of the project area support open, grassy habitats, soils are very shallow, with large expanses of exposed rock. These conditions indicate low potential to support Spalding's catchfly. The species was not observed during field surveys.

## Sensitive Species and Forest Species of Concern

One population of **large Canadian St. Johnswort** (*Hypericum majus*) occurs on private timber industry land in the project area, in peatland habitat adjacent to National Forest lands. This species occurs in peatland and other wetland habitats in the Pacific Northwest in British Columbia, with scattered occurrences in Washington and northern Idaho. No occurrences of this species were found during surveys of wetlands on National Forest lands in the project area. All suitable wetland habitats would be buffered from project activities (see Chapter 2). The buffers would be site-specific and would be established by a qualified botanist.

**Western goblin** and other sensitive moonworts typically occur in mature, moist to wet forest habitat. Sensitive moonworts depend on soil mycorrhizae[1], which may be destroyed during ground-disturbing activities. Forest moonworts also appear to require closed-canopy conditions (Wagner and Wagner 1994). The documented occurrence of western goblin and its surrounding habitat would be buffered from all proposed activities (see Chapter 2). The buffer would be site-specific and would be established by a qualified botanist.

[1] Mycorrhizae are symbiotic relationships between soil fungi and the roots of certain plant species. While their ecology is poorly understood, mycorrhizal relationships apparently enhance nutrient uptake by the host plants (Allen 1991).

Although no occurrences of **green bug-on-a-stick moss** (*Buxbaumia viridis*) were identified, suitable wet forest habitat for the species occurs at stream crossings associated with proposed road construction. This species occurs on well-rotted logs in moist to wet, relatively mature forest habitat.

No other sensitive species were identified, and the potential for their occurrence was determined to be low.

## *Environmental Consequences*

### Methodology

The boundary for the cumulative effects analysis area for TES plant species is the same as the boundary for the project area, due to the limited dispersal patterns of rare plant species known to occur in the Kaniksu portion of Idaho Panhandle National Forests. The cumulative effects analysis area represents the likely limit of effects on rare plant populations from implementation of the action alternative; it is based on the expected distance of seed and spore dispersal of most TES plants. Additional supporting rationale for determination of the analysis area for rare plants is in the botanist's report in the project file – rare plants section.

The period for measuring cumulative effects is ten years following completion of harvest and other restoration projects, or, in the event of selection of the no action alternative, ten years after the date of the signing of the decision. Beyond ten years, the likelihood of events or activities affecting rare plants and suitable habitat would be difficult to predict.

Analysis of the potential effects on rare plants and/or suitable habitat was conducted using results of rare plant surveys, current distribution of rare plant species in habitats similar to those found in the project area, current knowledge of the ecology of rare species known or suspected to occur in the project area, predicted effectiveness of the design features in Chapter 2, and professional judgment.

The issue indicator for analysis of effects on rare plants is the relative amount of canopy opening and/or ground disturbance in and adjacent to documented rare plant occurrences and suitable habitat. The issue indicators were determined based on the affinity of sensitive forest moonworts for relatively closed-canopy conditions (see above), the dependence of moonworts on soil mycorrhizae (see above), and the potential for destruction of undetected individuals of rare plant species during project implementation.

### Species Screen

The Council on Environmental Quality (40 CFR 1502.2) directs that impacts to resources from proposed activities be discussed in proportion to the potential for effects from project activities. Certain species are not analyzed because no suitable habitat for them occurs in the project area. Other species and habitats are not analyzed because mitigation as proposed in Chapter 2 would preclude any direct, indirect, or cumulative effects.

Table 3-6 displays the level of analysis for TES plant species and Forest species of concern. See the project file – rare plants section for additional information and supporting rationale on species that are not discussed further in this document.

**Table 3-6. TES plant species analyzed in the project area**

| | Species or habitat presumed not present. No detailed analysis in the Environmental Consequences section is necessary | Species or habitat presumed present but not affected by the proposed actions. No detailed analysis in the Environmental Consequences section is necessary | Species or habitat considered present and affected. Detailed discussion and analysis included in the Environmental Consequences section |
|---|---|---|---|
| **Threatened Species** | | | |
| Water howellia (*Howellia aquatilis*) | | ✓ | |
| Spalding's catchfly (*Silene spaldingii*) | ✓ | | |
| **Region 1 Sensitive Species/Forest Species of Concern** | | | |
| Deciduous riparian guild species | ✓ | | |
| Dry forest guild species | ✓ | | |
| Subalpine guild species | ✓ | | |
| Cold forest guild species | ✓ | | |
| Moist forest guild species (excluding moonworts) | ✓ | | |
| Wet forest guild species (excluding moonworts and green bug-on-a-stick moss) | ✓ | | |
| Aquatic guild species | | ✓ | |
| Peatland guild species | | ✓ | |
| Large Canadian St. Johnswort (*Hypericum majus*) | | ✓ | |
| Moonworts (*Botrychium* spp.) | | | ✓ |
| Green bug-on-a-stick moss (*Buxbaumia viridis*) | | | ✓ |

## Direct and Indirect Impacts

### *Alternative A – Proposed Action*

The identified western goblin and its adjacent habitat would be buffered from all management activities; therefore, no direct impacts to this population would occur. However, undetected individuals of this and other sensitive moonworts may occur in areas that are proposed for harvest activities. Although such habitat was found to have very low potential to support these species, sensitive moonworts have a broader habitat range than other rare plants, and they may go undetected due to their small stature and inconsistent occurrence of above-ground stalks. Timber harvest, fuels treatments, and reforestation could directly impact undetected moonworts.

Wet forest guild habitat at stream crossings associated with proposed new road construction may also support sensitive moonworts. Undetected individuals could therefore be impacted with

implementation of Alternative A. Similarly, undetected individuals of the diminutive green bug-on-a-stick moss could be impacted.

### *Alternative B – No Action*

Management activities would not change from current levels, and current vegetation trends would be expected to continue. No direct or indirect impacts to TES plants or Forest species of concern would occur.

## Cumulative Effects

### *Alternative A – Proposed Action*

Cumulative effects on rare plant species and suitable habitat from proposed activities are generally described as very low, low, moderate, or high, with the following definitions:

**very low** = no measurable effect on individuals, populations or habitat

**low** = individuals, populations and/or habitat not likely affected

**moderate** = individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not be reduced over the long term below a level which could support sensitive plant species

**high** = populations would likely be affected and/or habitat capability may be reduced over the long term below a level which could support sensitive plant species

The following past, current, ongoing, and reasonably foreseeable events apply to the cumulative effects analysis for TES plants:

#### Past Activities and Events

- Timber harvest on National Forest and private lands in the project area
- Road construction
- 1926 wildfire

#### Current and Ongoing Activities

- Road maintenance
- Timber harvest on private lands in the project area

#### Reasonably Foreseeable Actions

- Other restoration projects – noxious weeds monitoring and treatment.
- Timber harvest on private lands in the project area

#### Past Activities and Events

Past wildfire, timber harvest and road construction on private and National Forest lands in the project area may have affected rare plants and/or rare plant habitat through ground disturbance, canopy removal and/or the introduction of exotic plant species. Wetlands in particular may have been affected, since it is unlikely that they would have been adequately buffered from harvest or other activities.

### Current and Ongoing Activities

Road maintenance would typically occur in areas with low suitability as rare plant habitat. Therefore, no effects to rare plants would be expected to occur from these activities. Ongoing timber harvest on private lands in the project area could impact rare plants and rare plant habitats, including habitat for and/or populations of the sensitive plant species under discussion. The extent of impacts to populations and suitable habitat on private lands is unknown.

### Reasonably Foreseeable Actions

Weed treatment and monitoring would follow guidelines established in the Sandpoint Noxious Weeds Control Project EIS (USDA Forest Service 1998c). Effects to rare plant species were analyzed in that document and its adaptive strategy. No effects to rare plants beyond those described in that EIS are expected to occur.

Reasonably foreseeable timber harvest on private lands in the project area could impact rare plants and rare plant habitats, including habitat for and/or populations of the sensitive plant species under discussion. The extent of impacts to populations and suitable habitat on private lands is unknown.

### Summary of Cumulative Effects of Alternative A

Based on the above analysis, cumulative impacts to western goblin, green bug-on-a-stick moss and wet forest guild habitat for other sensitive species would be low (individuals, populations and/or habitat not likely affected) to moderate (individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level that could support the species). The documented occurrence of western goblin would be protected. Wet forest guild habitat for moonworts and green bug-on-a-stick moss, with the exception of stream crossings associated with proposed road construction, would be buffered from all activities.

## *Alternative B – No Action*

Management activities would not change from current levels, and current vegetation trends would be expected to continue. No cumulative impacts to any TES plants would be expected to occur from implementation of this alternative.

## Consistency with Forest Plan and Other Laws and Regulations

A Forest Plan management goal is to “manage habitat to maintain populations of identified sensitive species of animals and plants” (USDA Forest Service 1987, p. II-1). A Forest Plan standard for sensitive species is to “manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to Federal listing under the Endangered Species Act” (USDA Forest Service 1987, p. II-28). The Forest Plan also identifies the need to “determine the status and distribution of threatened, endangered, and rare (sensitive) plants on the Idaho Panhandle National Forests” (USDA Forest Service 1987, p. II-18).

Across the Forest, suitable habitat for sensitive plant species appears to be well distributed. Approximately 625,000 acres have been identified as having the potential to support sensitive plant species in a wide array of plant communities. To date 78,689 acres (about ten percent) of suitable habitat have been surveyed for sensitive plants (USDA Forest Service 2003).

In 1998, sensitive species trends across the Forest were qualitatively assessed (USDA Forest Service 1998b, pp. 112-116). Of the sensitive plant species assessed, 11 species were considered to have fairly secure populations with stable trends and few observed threats; 28 species had mostly stable populations with some concerns and threats; and for 16 species there was a serious concern. Estimates for this assessment were based on the best information available, including known population size, distribution, and threats. Green bug-on-a-stick moss was described as having some concerns regarding population viability on the Forest. Western goblin was considered to have serious concern for long-term trends.

Since implementation of the Forest Plan in 1987, impacts to highly suitable habitat for many sensitive plant species have diminished with the implementation of laws and policies protecting riparian areas, wetland and peatland habitats, and policies designed to maintain old growth forests.

At the project level, to prevent further declines in populations of sensitive species, suitable habitat has been identified and surveyed, and the documented occurrence of western goblin would be protected from disturbance. Both alternatives would meet Forest Plan direction, as well as NFMA requirements for maintaining population and species viability.

# Noxious Weeds

## *Regulatory Framework*

Federal legislation, regulations, policy, and direction that require development and coordination of programs for the control of noxious weeds and evaluation of noxious weeds in the planning process include the following:

- National Forest Management Act (NFMA) (1976)
- National Environmental Policy Act (NEPA) (1969)
- Forest Service Manual (Chapter 2080, as amended) (2000)
- Executive Order #13112 (1999)
- Idaho Panhandle National Forests Forest Plan (1987)
- Idaho Panhandle National Forests Weed Pest Management EIS (1989)
- Sandpoint Ranger District Noxious Weed Control Project EIS (1998c)

The Forest Service Handbook (FSH 34409) defines a strategy for managing pests, including noxious weeds, as “a decision-making and action process incorporating biological, economic and environmental evaluation of pest-host systems to manage pest populations” (FSH 3409.11, 6/86). This strategy is termed Integrated Pest Management (IPM).

The overall Idaho Panhandle National Forests strategy is to contain weeds in currently infested areas and to prevent the spread of weeds to susceptible but generally uninfested areas. The 1989 Idaho Panhandle National Forests Weed Pest Management EIS describes the strategy.

Weed management activities in the Sandpoint Ranger District are guided by the Sandpoint Noxious Weed Control Project EIS (USDA Forest Service 1998c). Copies of the EIS are available at the District office.

Noxious weeds are those plant species that have been officially designated as such by Federal, State or County officials. In *Weeds of the West* by Whitson et al. (1996), a weed is defined as "a plant that interferes with management objectives for a given area of land at a given point in time." The Federal Noxious Weed Act of 1974 defines a noxious weed as "a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States or the public health" (P.L. 93-629).

The Idaho Noxious Weed Law defines a "noxious weed" as any exotic plant species established or that may be introduced in the State which may render land unsuitable for agriculture, forestry, livestock, wildlife or other beneficial uses and is further designated as either a statewide or countywide noxious weed (Idaho Code 24 Chapter 22).

Both Federal and State laws define weeds primarily in terms of interference with commodity uses of the land. However, the impacts of noxious weeds on noncommodity resources such as water quality, wildlife, and natural diversity are of increasing concern.

## *Affected Environment*

### Methodology

Sources of information for the Affected Environment discussion include rare plant surveys of the project area conducted in 1991, 1994, 1995, and 2002, and documented known locations from the Sandpoint Ranger District Noxious Weed Control Project Final Environmental Impact Statement (1998c). Survey documentation is located in the project file – weeds section.

### Documented Weed Infestations in the Project Area

According to the Sandpoint Noxious Weed Control Project FEIS (USDA Forest Service 1998c), about 100 acres of National Forest lands in the project area have some degree of concentrated weed infestation (USDA Forest Service 1998c). The following weed species were located in the project area in 1996 during surveys conducted for the Sandpoint Ranger District Noxious Weed Control Project FEIS (USDA Forest Service 1998c): ox-eye daisy (*Leucanthemum vulgar*e), hawkweeds (*Hieracium* spp.), spotted knapweed (*Centaurea maculosa*), common St. Johnswort (*Hypericum perforatum*), common tansy (*Tanacetum vulgare*), and sulfur cinquefoil (*Potentilla recta*).

In 2002, dotted St. Johnswort (*H. maculatum* ssp. *Obtusiusculum*) was identified along road 1023. This nonnative species had never before been documented in the United States. The strategy for this new invader is eradication. All identified individuals of this species were hand pulled in the summer of 2003. It is expected that follow-up treatments with additional hand pulling or herbicide application would be necessary to eradicate this population. Cooperation with neighboring landowners to identify and remove additional individuals would also be required.

Given the lack of effective prevention measures prior to and following past disturbances from timber harvest and road construction on public and private lands in the project area, some noxious weed species (such as common St. Johnswort and spotted knapweed) are likely scattered throughout the project area. Untreated infestations on private lands in the project area have probably spread to National Forest lands, and vice versa.

The Wrenco Loop area has been identified as a high priority for treatment of roadside infestations; biological control for off-road infestations is recommended (USDA Forest Service 1998c). There is also an opportunity for cooperative weed management between the Forest Service and the adjacent timber industry landowner in the project area.

## *Environmental Consequences*

### Methodology

Effects analysis was conducted using results of past noxious weed surveys and an assessment of the types of proposed project activities. The estimation of risk of weed spread and introduction of new weed invaders from the proposed activity is based on peer-reviewed literature and professional judgment.

The cumulative effects analysis area for noxious weeds is the project area. This determination considered likely seed dispersal distances and the extent of currently documented weed infestations. Transport of weed seeds out of the project area is possible, with occasional transport over long distances (such as on vehicles). However, it would be difficult to predict the extent of such long-distance dispersal. It is likely that most seeds of noxious weeds would fall close to the parent plant.

In addition, adjacent public and private lands have noxious weed infestations similar to those on National Forest lands, so transport of weed seeds to these lands from the project area would have little additional impact. For these reasons, the cumulative effects analysis area for noxious weeds is the project area.

Effects of proposed actions on noxious weed spread are measured based on the amount of canopy removal and on predicted amount of soil and/or understory vegetation disturbance. Analysis of effects to noxious weeds of various activities relies on the following assumptions:

- Thinning (approximately 530 acres) would remove from 30 to about 60 percent of the tree canopy, with a lower risk of weed spread than with regeneration harvest.
- Regeneration treatments would occur on about 82 acres, would remove a significant portion of the canopy (greater than 70 percent), and would treat fuels with site preparation. This type of harvest carries a greater risk of weed spread than selective harvest or thinning, particularly when in proximity to existing infestations.
- Tractor yarding, which is proposed on 240 acres, would result in greater soil disturbance – and higher susceptibility to weeds than skyline yarding (proposed on 86 acres). Tractor logging in winter, which is proposed on about 285 acres, would cause little if any soil disturbance and would carry a low risk of weed spread.
- Even in the absence of soil or vegetation disturbance, some weed species may invade if tree canopy cover is significantly reduced.

### Direct and Indirect Effects

#### *Alternative A – Proposed Action*

There would be a risk of weed spread associated with new road construction. Preventive seeding and monitoring as proposed would reduce, but not eliminate, this risk. Based on past monitoring (see project file – weeds section), preventive seeding and monitoring would greatly reduce the

risk of new invaders becoming established. The risk of weed spread would decrease over time as desired species become established. Design criteria to reduce impacts from road construction activities have the highest potential to reduce the likelihood of spread or introduction of noxious weeds in the project area. Contract requirements to clean off-road harvest equipment prior to entry into the sale area would further reduce the risk of weed spread from project activities.

There is also a risk of weed spread from other ground-disturbing and canopy-opening activities. Skid trails and areas with greater than 50 percent canopy removal would be susceptible to noxious weed invasions. Preventive seeding of native and desired non-native species would reduce, but not eliminate, the risk of weed spread.

A slight increase in the risk of weed spread is predicted for grapple piling. Though many of the common weeds invade after site preparation, they tend to decrease as the site becomes stocked with planted conifers and/or native vegetation, particularly brush species. This long-term process of vegetation succession may take 20-30 years or more to achieve canopy closure.

Underburning and pile burning may affect weed populations. Noxious weed populations respond to fire in several different ways. Depending on the species, plants may be killed, but the population may persist through germination from an existing seed bank, as with St. Johnswort and knapweed (Harrod and Reichard 2001). Knapweed and other species resprout from root crowns or rhizomes. Prescribed fire activities (including construction of firelines) provide suitable habitat for invasive species, which can become established in these disturbed areas before native vegetation can re-invade (Harrod and Reichard 2001). Preventive seeding and monitoring would reduce the risk of weed spread from these activities.

Closing the area to motorized vehicles except on designated routes would reduce off-road use in the project area. The risk of noxious weed spread from off-road vehicle use would be reduced.

Features designed to prevent the introduction of new noxious weeds and reduce the spread of weeds from proposed activities are expected to be fairly effective on roads, skid trails and landings. Reduction of off-road vehicle use as a result of the proposed road closure would also reduce the spread of weeds. However, canopy reduction and underburning in some areas may increase susceptibility, particularly near existing weed populations. The effects from canopy reduction and underburning would be reduced over time as understories and overstories grow in.

### *Alternative B – No Action*

Under the no action alternative, there would be no change in the risk or rate of weed spread, since management practices would not change from current conditions. Treatment of existing weed infestations and monitoring for new invaders would be dependent on District priorities and the availability of appropriated funding. If the no action alternative were selected, the Wrenco Loop area would likely become a lower priority for weed treatment, with the exception of the new invader, dotted St. Johnswort. With implementation of the no action alternative, seeds from weeds on public and private lands within the project area may still be transported by vehicles, people, birds, and wildlife.

## Cumulative Effects

Cumulative effects with regard to noxious weeds from proposed activities are generally described as very low, low, moderate, or high, with the following definitions:

**very low** = no measurable effect on existing weed infestations or susceptible habitat

**low** = existing weed infestations and/or susceptible habitat not likely affected

**moderate** = existing weed infestations or susceptible habitat affected, with the potential for expansion into uninfested areas and/or establishment of new invaders

**high** = weed infestations and/or susceptible habitat affected, with a high likelihood of expansion into uninfested areas and/or establishment of new invaders

The period for measuring short-term cumulative effects to noxious weeds and susceptible habitat is ten years following completion of harvest and other restoration projects, or, in the event of selection of the no action alternative, ten years after the date of the signing of the decision. The ten-year period is based on the expected recovery and/or establishment of desired understory species in disturbed areas. Predicted long-term effects to noxious weeds from loss of canopy cover are also addressed below.

The following past, current, ongoing, and reasonably foreseeable events apply to the cumulative effects analysis for noxious weeds:

#### Past Activities and Events

- Timber harvest on National Forest and private lands in the project area
- Road construction
- 1926 wildfire

#### Current and Ongoing Activities

- Road maintenance
- Timber harvest on private lands in the project area

#### Reasonably Foreseeable Actions

- Other restoration projects – noxious weeds monitoring and treatment
- Timber harvest on private lands in the project area

### *Cumulative Effects Common to Both Alternatives*

Under both alternatives, cumulative effects with regard to new invaders are expected to be low. Under Alternative B, because no new disturbance would occur, no new invaders would be expected to become established, and the population of dotted St. Johnswort would remain a high priority for eradication. Under Alternative A, because of features designed to detect and eradicate new invaders (see Chapter 2), no new invaders are expected to become established.

Cumulative effects with regard to existing weed infestations are expected to be moderate for both alternatives. Off-road infestations of spotted knapweed and common St. Johnswort would be expected to persist, since these species are considered to be naturalized in the project area. Treatment of off-road infestations with biological control agents may reduce the size of the infestations, but would not eliminate them. The determination of cumulative effects common to both alternatives also considered the following:

#### Past Activities and Events

Past wildfire, timber harvest and road construction on private and public lands provided areas of disturbance of soil, vegetation and canopy cover for invasion by non-native plant species,

including noxious weeds. Because of inadequate past weed prevention and control practices, the effects of these activities on noxious weed spread are still evident.

The loss of canopy cover from past timber harvest may have been a factor affecting weed spread in the area. As the tree canopy closes, shade-intolerant weeds will, over the long term, be displaced. This process could take another 20-30 years or more.

### Ongoing Activities and Reasonably Foreseeable Actions

Ongoing and reasonably foreseeable road maintenance activities and timber harvest activities on private lands within the project area may result in ground disturbance that would be conducive to new weed invaders becoming established, and to the spread of existing weed populations. Preventive seeding with desired species and regular monitoring for and treatment of weeds on National Forest lands would reduce the risk of weed spread; however, if private landowners do not treat their weed infestations or adopt similar weed prevention practices, weed infestations on private lands within the project area will likely spread onto National Forest lands.

Reasonably foreseeable noxious weed treatment and monitoring would follow guidelines established in the Sandpoint Noxious Weeds Control Project EIS (USDA Forest Service 1998c). The risk of new invaders becoming established would be low.

### *Alternative A – Proposed Action*

Cumulative effects with regard to existing weed infestations are expected to be low to moderate, considering the following:

Short-term cumulative effects regarding susceptibility to weeds would be associated with proposed ground-disturbing activities. Proposed mitigation described in Chapter 2 would reduce but not eliminate the risk of weed spread. Given that the project area is characterized by forest in a relatively immature successional stage, areas currently dominated by native understory shrubs would be expected to recover to current levels within about ten years after implementation of this alternative. Zack (1994) found that, in some north Idaho habitat types, dense shrub canopies developed by the middle of the first decade after disturbance, and that exotic species that were present in the earliest stages generally did not persist.

Areas not currently dominated by native understory shrubs would remain susceptible to weed infestation for a longer period. Over the long term, tree canopy cover lost through implementation of the proposed activities would recover. As tree canopy closes, the susceptibility to weeds of treated areas would decrease. However, this process could take 40-50 years.

Implementation of weed treatment and monitoring as proposed under the action alternative would be expected to reduce the incidence of weed infestations along roads in the project area. Prevention practices as proposed would reduce but would not eliminate the risk of spread in areas of new off-road disturbance.

Given the current level of off-road weed infestation of naturalized weed species in the project area, and the potential for weeds to infest National Forest lands from surrounding private lands in the project area, implementation of Alternative A would be expected to have little net cumulative effect on the existing weeds in the project area over the long term.

## Consistency with Forest Plan and Other Laws and Regulations

According to the Idaho Panhandle Forest Plan (1987) direction, infestations of many noxious weed species are so widespread that control would require major programs that are not possible

within expected budget levels (Forest Plan, p. II-7). Forest Plan direction is to "provide moderate control actions to prevent new weed species from becoming established". Alternative B (No Action) meets Forest Plan direction by not creating disturbance conducive to new noxious weed invasions or spread of existing weed populations. Alternative A (Proposed Action) also meets Forest Plan direction by providing moderate control actions through project design, as required by the Forest Plan, to prevent new weed species from becoming established. In addition, both alternatives are consistent with the Forest Service Manual, and Executive Order 13112.

It should be noted that, since the Forest Plan was implemented in 1987, the issue of weed infestations on National Forest Lands has evolved to encompass broader issues of native ecosystems integrity and the effects to noncommodity resources and ecosystem processes. Appropriated funding levels for noxious weeds programs in the Idaho Panhandle National Forests have increased dramatically since the mid-1990s, and the trend is toward sustaining or increasing those funding levels. The Forest Plan revision process considers the increased emphasis on weed management.

# Wildlife

## *Regulatory Framework*

Regulatory direction applicable to the management of wildlife resources on the Idaho Panhandle National Forest include:

- The Endangered Species Act of 1973 (ESA), as amended
- Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)
- National Forest Management Act of 1976 (NFMA)
- The Migratory Bird Treaty Act of 1918
- Idaho Panhandle National Forests Forest Plan (USDA Forest Service 1987)
- Forest Service Manual (FSM) and Handbook (FSH) direction

Following is a summary of regulatory guidance and its relation to the management of wildlife species and habitats in the Idaho Panhandle National Forest.

### Threatened, Endangered, Proposed Species

The National Forest Management Act of 1976 (NFMA) and the Endangered Species Act of 1973 (ESA) as amended, require the Forest Service to manage wildlife habitat to maintain viable populations of native and desirable nonnative wildlife species and promote the conservation of listed threatened or endangered species populations (36 CFR 219.19). Additional guidance is found in Forest Service Manual direction that states: "*identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species*" (FSM 2670.31 [6]).

The ESA requires the Forest to manage for recovery of threatened, endangered, and proposed (TEP) species and the ecosystems upon which they depend. The Forest is required to consult with the US Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species. The direction requires the Forest Service to complete biological assessments to document whether projects would likely have adverse effects on identified habitats or populations of threatened or endangered animals.

### Sensitive Species

The Forest Service Manual also directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern. The direction requires the Forest Service to manage the habitat of the species listed in the Regional Sensitive Species List (USDI 2005) to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act.

### Management Indicator Species and Other Wildlife

Management Indicator Species (MIS) are identified in the planning process and used to monitor effects of planned management activities on populations of wildlife and fish, including those that are socially or economically important. MIS relevant to the project area and the Sandpoint Ranger District are marten, pileated woodpecker, northern goshawk, and white-tailed deer. Snag habitat is considered an important habitat component for several MIS.

## *Analysis Methods*

### Analysis Area

The analysis area for each species can differ due to habitat requirements and extent of effects. The cumulative effects analysis area is described for each species in the Cumulative Effects sections.

### Species Not Analyzed in Detail

A preliminary analysis was conducted for each potentially affected wildlife species and their habitat to determine the scope of analysis. The species listed in table 3-7 would not likely be affected by proposed activities because they do not have suitable habitat, are not regularly present or are not expected to be in or near the project area. For these reasons, these species were not analyzed in detail. Preliminary analysis information for species not analyzed in detail is located in the Wildlife section of the project file.

## *Affected Environment – Species Analyzed in Detail*

This section describes the status and distribution of wildlife species analyzed in detail that have been identified as species of concern within the project area and could potentially be affected by proposed activities. It also describes the environmental baseline and relevant habitat components that may or may not be affected by the alternatives. Information presented in this section is based on scientific literature, wildlife databases, professional judgment, recent field surveys, and habitat evaluations.

The resource information provided, especially as it relates to habitat analysis, includes past actions (timber harvesting and road building) that have influenced vegetative changes to what now is part of the existing or baseline condition. For example, the characterization of forest structure from a past regeneration harvest would acknowledge changes that have occurred over the past 25 years, from stand initiation to a mid-seral stage of succession.

**Table 3-7. Wildlife species not analyzed in detail**

| Species | Rationale for Elimination from Detailed Analysis | Preferred Habitat |
|---|---|---|
| **Threatened and Endangered Species** | | |
| Bald Eagle (*Haliaeetus leucocephalus*) | No known nests or winter roosts within the project area. | Normally nest and forage near large bodies of water. Winter visitors and yearlong residents of northern Idaho. |
| Northern Gray Wolf (*Canis lupus*) | No wolf activity documented within or near the project area. | Wide variety of habitats that are generally remote and isolated from human development. Adequate populations of prey species, often wintering concentrations of deer or elk. |
| Grizzly Bear (*Ursus arctos horribilis*) | No evidence of recent use of the project area. The project is outside the grizzly bear recovery zones and documented reoccurring use areas. | Habitat generalist. Denning areas isolated and remote from human development. |
| Woodland Caribou (*Rangifer tarandus caribou*) | A single caribou documented in the area in 1991 (a random and extremely rare event). The project area is outside the recognized caribou habitat. | Above 4,000 ft. in Englemann spruce/subalpine fir and western red cedar/western hemlock forests. |
| Canada Lynx (*Lynx Canadensis*) | No suitable habitat present. No sightings have been reported. The project lies outside established Lynx Analysis Units. | Higher elevation lodgepole pine and spruce/ fir forests with adequate prey base of snowshoe hares, its primary food. |
| **Sensitive Species** | | |
| Townsend's Big-eared Bat *(Plecotus townsendii)* | No suitable habitat (e.g. roosting, maternity, hibernation) is present within the project area for this species. | Caves, mines, and abandoned buildings. |
| Coeur d'Alene Salamander *(Plethodon vandykei idahoensis)* | No suitable habitat exists in the project area for this species. | Springs, seeps, spray zones. |
| Fisher *(Martes pennanti)* | No suitable habitat exists in the project area for this species. | Mesic forested habitats. |
| Wolverine *(Gulo gulo)* | No suitable habitat exists in the project area for this species. | Far-ranging omnivorous habitat generalist. |
| Northern Bog Lemming *(Synaptomys borealis)* | No suitable habitat exists in the project area for this species. | Bogs, fens and, wet alpine and sub-alpine meadows. |
| Peregrine Falcon *(Falco peregrinus anatum)* | No suitable habitat exists in the project area for this species. | Open habitats near cliffs and mountains. Nesting cliffs near an adequate prey base. |
| Common Loon *(Gavia immmer)* | No suitable habitat exists in the project area for this species. | Large, clear lakes below 5,000 ft. elevation with at least a partially forested shoreline. |
| Harlequin Duck *(Histrionicus histrionicus)* | No suitable habitat exists in the project area for this species. | Shallow, swift streams in forested areas. |
| Black Swift *(Cypseloides niger)* | No suitable habitat exists in the project area for this species. | Builds nest behind or next to waterfalls and wet cliffs. |

An important concept in the existing condition descriptions and analysis is the difference between capable habitat and suitable habitat. The following definitions are helpful in distinguishing between these two terms and the concepts they are based on.

*Capable habitat* refers to the inherent potential of a site to produce essential habitat requirements of a species. The vegetative structure and composition on the site may not currently provide the necessary attributes to support a species such as stand age, cover type or stand density, but it has the fixed attributes that would enable it to provide those variables under appropriate conditions. Some examples of fixed attributes are slope, aspect, soil or elevation.

*Suitable habitat* refers to wildlife habitat that currently has both the fixed and variable stand attributes for a given species' habitat requirements. Variable attributes change over time and may include stand age, cover type, stand density, tree size, or canopy cover.

## Sensitive Species

Table 3-8 summarizes sensitive wildlife species analyzed in detail, the rationale for analysis, and a description of their habitats.

**Table 3-8. Sensitive species analyzed in detail**

| Species | Rationale for Detailed Analysis | Preferred Habitat |
|---|---|---|
| Boreal Toad (*Bufo boreas*) | Terrestrial and breeding habitat is present within the project area. | Adults occur in a variety of uplands. Breed in shallow ponds, lakes, or slow moving streams. |
| Flammulated Owl (*Otus flammeolus*) | Suitable habitat is present in the study area. | Mature, old growth ponderosa pine, Douglas-fir forest. |
| Fringed Myotis (*Myotis thysanodes*) | Suitable habitat is present in the project area for this species. | Caves, mines, and abandoned buildings, large snag habitat. |
| Pygmy Nuthatch (*Sitta pygmaea*) | Suitable habitat is present in the project area for this species. | Ponderosa pine habitat, especially mature-old growth stands. |
| Northern Goshawk *(Accipiter gentilis)* | Suitable habitat is present within the project area. Recent nesting activity documented. | Mature to old growth forest with relatively closed canopies. |
| Black-backed Woodpecker *(Picoides arcticus)* | Suitable habitat for this species is present in the project area. | Mature conifer stands with numerous snags. Post-fire habitat producing an abundance of snags. |

### *Boreal Toad*

The boreal toad occurs throughout the West and is probably indigenous to every forest in the Intermountain Region. Boreal toads have experienced a decline in their distribution that may be related to alteration of wetland breeding habitat, habitat loss, fragmentation, and competition with introduced aquatic species.

Adult boreal toads are largely terrestrial and found in a variety of habitats from valley bottoms to high elevations and can include low elevation beaver ponds, reservoirs, streams, marshes, lake shores, potholes, wet meadows, and high elevation ponds and fens (Montana Department of Fish, Wildlife & Parks, no date). The breeding season for boreal toads extends from April to mid-July. This species breeds in shallow areas of lentic or slow-moving waters with mud bottoms. The diet of boreal toads includes insects, spiders, mites, millipedes, ants, and ground beetles. The boreal

toad is most active at night in lower elevations and diurnal at higher elevations and more northerly locales. It is inactive during winter. Like other toads, it buries itself in loose soils or hides in rodent burrows when inactive.

The Wrenco Loop project area has some potential breeding habitat for boreal toads in wet and riparian areas but overall, the habitat is limited (see map, project file – wildlife section).

Past road building activities likely had an effect on toad habitat. A portion of road 1023 on Riley Creek lands in the southern part of the project area was constructed in a wetland and likely removed toad habitat. Other road construction activities that crossed perennial streams may have impacted habitats as well.

### *Flammulated Owl*

Flammulated owls are seasonal migrants that occupy home ranges in the northern Rocky Mountains during spring, summer, and early fall. They are strongly associated with ponderosa pine forests during breeding and prefer open, single-storied stand structures for foraging (Hayward and Verner 1994, Reynolds and Linkhart 1992). Areas that are composed of at least 75 percent old ponderosa/Douglas-fir forest type are occupied by flammulated owls more than those areas with less than 75 percent of this forest type (Wisdom et al. 2000). Variability in stand structure also is an important component as flammulated owls nest and forage in open stands and tend to roost in fairly dense stands (Wisdom et al. 2000). Flammulated owls prefer mature ponderosa pine and Douglas-fir with low stand densities and moderately open canopies for nesting; however, they sometimes nest in spruce/fir, lodgepole pine, and aspen. Flammulated owls are secondary cavity nesters and favor cavities excavated by pileated woodpeckers and northern flickers. These owls feed primarily on moths and large insects at night.

The Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (Quigley and Arbelbide 1997) revealed that the amount of single strata, interior ponderosa pine forests that have been maintained by frequent, low-intensity fires have declined by approximately 80 percent from historic conditions to present. Accordingly, species associated with this community, such the flammulated owl, have declined in abundance.

While no population numbers exist for the historic presence of flammulated owls, inferences can be made when comparing the historical occurrence of ponderosa pine with current levels. Based on historic vegetation estimates, ponderosa pine comprised 11 percent of the National Forest lands within the Pend Oreille subbasin. Today, only two percent of these lands consist of sites that are predominately ponderosa pine. This is an 80 percent change from historic conditions. Therefore, flammulated owls were probably more abundant in the past than they are today.

Habitat for flammulated owls was modeled using a compilation of information derived from the Forest Timber Stand database (TSMRS) and 2004 field review notes located in the project file – vegetation section). The Wrenco Loop project area or the area used to evaluate possible effects encompasses about 1,010 acres of which 243 acres or 24 percent represents capable habitat for flammulated owls (drier forest habitats). Of capable habitat, only 36 acres (4% of the evaluation area) are currently functioning as suitable habitat (figure 3-3, map packet). It is likely that past timber harvest activities removed some the dead and dying component, affecting the availability of snags today.

The Wrenco Loop project area or the area used to evaluation possible effects encompasses about 1,010 acres, of which 244 acres or 24 percent of the analysis area represents drier forest habitats associated with the flammulated owl (capable habitat). Only 36 acres or 15% of the capable acres

are currently considered suitable habitat (figure 3-3, map packet). It is likely that past timber harvest activities removed some of the dead and dying component, affecting the availability of snags today.

These drier habitats tend to produce older, single strata ponderosa pine/Douglas-fir communities, which in turn provide the necessary habitat attributes for these species. Similar to the findings in the Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin, fire suppression policies have allowed vegetation changes that have reduced conditions for flammulated owls. Forest stands that were mostly dominated by low densities of ponderosa pine and Douglas-fir, have been replaced by more shade-tolerant species, leaving a forest that is highly vulnerable to drought stress, insect and disease infestations and high-intensity fires.

### *Fringed Myotis*

The fringed myotis is a member of the group of bats referred to as the “long-eared” bats. Fringed myotis use a fairly broad range of habitats usual represented by open areas (e.g. grasslands) interspersed with mature forests (usually ponderosa pine, pinyon-juniper or oak) at middle elevations that contain suitable roosts sites and are near water sources (Keinath 2004). Habitat capable of producing mature ponderosa pine and Douglas-fir with low stand densities and moderately open canopies are represented in the Wrenco Loop area.

Fringed myotis feed on insects during flight and glean insects off of vegetation, usually near the top of the forest canopy, with beetles and moths making up the majority of their diet (Keller 2000, O’Farrell and Studier 1980, Wisdom et al. 2000). Where available, fringed myotis use caves, mines, buildings and rock crevices as day, night, maternity and hibernation roosts sites (Ellison et al. 2004). They also roost underneath the bark and inside hollows of snags, particularly larger ponderosa pine and Douglas-fir snags in medium stages of decay (O’Farrell and Studier 1980, Rabe et al. 1998, Weller and Zabel 2001, Rasheed et al. 1995). Generally, snags used as roost sites are in somewhat open microsites within otherwise contiguous forest (Weller and Zabel 2001, Vanhof 1995).

The main risks to fringed myotis are the loss of suitable habitat for foraging or roosting and human disturbance of roost sites. Fringed myotis are perhaps more vulnerable to alterations of mature or old growth forest conditions than most bat species because of their close association with forests containing abundant, large snags for roosting (Keinath 2004). Tree harvest can also affect bats by potentially reducing foraging areas, as insect prey tends to concentrate just above the canopy and along forested edges. Timber harvest can also impact the thermal properties of the remaining forest. In addition, fringed myotis need riparian areas with natural stream hydrology and healthy riparian vegetation to allow for sufficient water sources and to promote use by emergent insects. Management activities that 1) manage for the retention and recruitment of large diameter snags at relatively high densities, particularly in late-successional forests; 2) protect known roost sites to prevent human disturbance or habitat alteration of microsite conditions, and; 3) maintain and improve riparian areas are beneficial to fringed myotis (Wisdom et al. 2000).

It is likely that past timber harvest activities removed some of the dead and dying component, affecting today’s availability of roosting habitat.

### *Pygmy Nuthatch*

The pygmy nuthatch is a sedentary, year round resident of ponderosa pine forests (Ghalambor 2003). It relies heavily on the foliage of live, larger ponderosa pines as foraging habitat and on larger ponderosa pine snags for nesting and roosting cavities (McEllin 1979). Their almost

exclusive association with ponderosa pine, particularly mature stands that are fairly open (<70% canopy closure), leads to a patchy distribution of the pygmy nuthatch as they mirror ponderosa pine distribution (Kingery and Ghalambor 2001, Engle and Harris 2001). Pygmy nuthatch abundance is directly correlated with snag density and foliage volume (Ghalambor 2003). They generally excavate their own nest cavity, but at times are a secondary cavity nester and locate their nest cavities in dead trees or in dead sections of live trees (Ghalambor 2003).

The main threats to pygmy nuthatches are the loss of ponderosa pine-dominated forests and low snag densities (Ghalambor 2003). Studies have shown that due to the high dependence of pygmy nuthatch on snags, reducing the number of snags greatly reduces pygmy nuthatch densities by decreasing the availability of suitable nest and roost cavities (Balda et al. 1983, Scott 1979). Therefore, management actions should retain or restore the long-term sustainability of ponderosa pine stands, retain and recruit large diameter ponderosa pine snags, and reduce the risk of stand-replacing fires in ponderosa pine stands. Habitat capable of producing mature ponderosa pine-dominated forests with low stand densities and moderately open canopies is represented in the Wrenco Loop area.

It is likely that past timber harvest activities removed some of the dead and dying component, affecting the availability of snags today.

### *Northern Goshawk*

The goshawk is a forest habitat generalist, although, due to its large size and wingspan, it tends to avoid young, dense forests. Optimal habitat consists of forest stands with canopy cover greater that 60 percent, overstory tree sizes greater than 15 inches in diameter, and a presence of dead or defective trees greater than ten inches in diameter.

Goshawks typically select large trees with northerly exposures for nesting (Hayward and Escano 1989). Nesting pairs of goshawks in the northern Rocky Mountains often have 6,000-acre home ranges (Reynolds et al. 1992). Goshawks typically use 3 to 9 alternate nest sites distributed among 1 to 5 different forest stands (Woodbridge and Detrich 1993). The post-fledging area surrounds the nest site that is used by the fledglings prior to independence from their parents. This critical area contributes to the survival of young goshawks and typically occurs within 420 acres of the nest tree (Reynolds et al. 1992). Young goshawks typically fledge by July and use the post-fledging area for four to six weeks (Bull and Hohmann 1993). Additional feeding habitat surrounds the nest within the home range. Optimal goshawk nesting habitat has approximately 30 acres for the nest site, 420 acres for the post-fledging area and 5,400 acres for adjacent foraging habitat (Reynolds et al. 1992). Habitat areas should be contiguous and meet habitat requirements to support a nest site and alternate nest sites.

The fire of 1926 and the loss of white pine due to blister rust have been important factors that modified habitat for goshawks in the Wrenco Loop area. Fires burned over much of the area, removing most of the suitable nesting habitat for goshawks and, leaving most of the project area in the early stages of ecological succession.

Today’s landscape contains remnant pockets of white pine, ponderosa pine, and western larch. Douglas-fir and grand fir have replaced much of the growing space once occupied by these species. This change has increased the forest’s vulnerability to drought stress, insect and disease infestations, and large, stand-replacing fires, and has reduced habitat suitability for goshawks. Controlling wildfires since the early 1900s has also reduced age-class diversity. The project area is dominated by an immature forest (80- to 90-year-old trees) with relatively open understories of

dense Douglas-fir and grand fir regeneration. Past salvage harvesting likely removed forest structure associated with nest sites.

Habitat for goshawks was modeled using a compilation of information derived from the Forest Timber Stand database (TSMRS) and 2004 field review notes located in the project file – vegetation section). Suitable and capable habitat has previously been defined in the flammulated owl section. Capable habitat for northern goshawks includes stands of moderately dry Douglas-fir or grand fir, moist grand fir, western red cedar and western hemlock (habitat type groups 2-6), occurring on the lower one-third or bottom of the slope with 40 percent slope or less (Haward and Escano 1989, Warren 1990, Reynolds et al. 1992, and Graham et al. 1999). Suitable habitat generally consists of stands in the later stages of succession (mature and old growth trees) having moderate to high tree densities (canopy cover of 50 percent or more).

While all stands in the project area are considered capable goshawk habitat, nesting habitat is the most critical and limiting feature. Consequently, a habitat suitability analysis will focus on nesting habitat because foraging habitat embraces a broader spectrum of forest structural conditions, representing a general relaxation of habitat requirements.

The Wrenco Loop project area contains 765 acres that are characterized as capable nesting habitat, representing 76 percent of the evaluation area. Currently, none of these acres are functioning as suitable habitat (figure 3-4, map packet). While there can be minor variations of forest structure within stands that provide nesting possibilities, the prevalence of immature trees leads to unsuitable conditions.

Goshawk surveys conducted by Forest Service personnel first discovered an active nest/territory within the project boundary in 1996. Alternate nests have since been discovered. Surveys conducted in 2002 determined the historic territory was active (sighting of an adult goshawk vocally defending a nest). Although the nest status was not determined, evidence suggested at least a nesting attempt was made (USDA Forest Service 2002c). Surveys conducted in 1998, 2003 and 2004 did not detect any active nesting territories in the project area (project file – wildlife section).

### *Black-Backed Woodpecker*

The black-backed woodpecker is a year-round resident that occurs in various forest types over a wide elevation range. It is regarded as a narrow endemic (a species ecologically restricted to very specialized habitats), responding positively to fires and other large-scale disturbances.

A Wyoming/Montana study conducted by Hutto (1995) revealed that they are nearly restricted to early post-fire habitats. While populations are irruptive in response to beetle outbreaks connected to recent fires, source habitats include late-seral forests (Wisdom et al. 2000). These forests that contain patches of beetle-infested trees may provide adequate habitat to support baseline populations of black-backed woodpeckers when burned areas are not available (Montana Bird Conservation Plan 2000).

In a study that involved stand-replacement fires and subsequent salvage logging, Saab and Dudley (1998) found that black-backed woodpeckers favored the unlogged controls for nesting. These areas were characterized as sites with high densities of relatively small, hard snags. Compared to other cavity-nesting birds, black-backed woodpeckers selected nest sites with the highest densities and the smallest diameters of snags (Saab and Dudley 1998).

The project area is marginal black-backed woodpecker habitat due to 1) lack of post-fire habitat, 2) relative low density of insect and disease, and 3) limited source habitats. Past salvage logging

on National Forest system lands has had minimal influence on today's abundance and distribution of black-backed woodpeckers. Intense logging on adjacent ownerships, especially on the west and north sides on the project area, has temporarily precluded the opportunities for high densities of snag recruitment (source habitat) in the event of high severity fires.

## Management Indicator Species and Others

Table 3-9 lists MIS wildlife species known or suspected to occur in the Forest, their status in the Forest and within the analysis area, and a description of their habitats.

**Table 3-9. Management indicator species occurring in the Idaho Panhandle National Forests**

| Species | Rationale for Detailed Analysis | Preferred Habitat |
|---|---|---|
| Northern Goshawk (*Accipiter gentilis*) | See table 3-8 | See table 3-8 |
| Pileated Woodpecker | Suitable habitat exists within the project area. | Forests with tall, large diameter dead or defective trees for nesting. |
| Marten | Adequate habitat is available to maintain a local viable population. | Variable mature confer stands with canopy closures greater than 40 percent with abundant large, down woody debris. |
| White-tailed Deer Winter Range | Adequate habitat is available to contribute to local populations. | Mosaic of habitat types that provide open parks for foraging and forested areas for thermal and security cover. |

### *Pileated Woodpecker*

Pileated woodpeckers are year-round residents preferring forests with tall, large-diameter dead or defective trees for nesting. Pileated woodpeckers feed primarily on carpenter ants and other insects excavated from deep within dead and decaying wood (Bull 1989, Aney and McClelland 1990).

Nesting habitat for pileated woodpeckers in the northern Rocky Mountains most commonly occurs in forest stands with live or dead western larch, Douglas-fir, ponderosa pine, and black cottonwoods greater than 18 inches in diameter with moderate canopy cover. New nest cavities are excavated each year in stands of 50 to 100 continuous acres, generally below 5,000 feet in elevation with basal areas of 100-125 square feet per acre and a relatively closed canopy (Aney and McClelland 1990). Nest trees typically are large diameter, dead trees at least 30 feet high (Bull 1989). Snag abundance and large-diameter trees are critical components of pileated woodpecker habitat.

Since the 1930s, the Wrenco project area landscape has become dominated by 80- to 90-year-old trees. Consequently, there is only a small amount of mature forest and few large-diameter snags in the project area and it is not good pileated woodpecker habitat. It is likely that past timber harvest activities removed some of the dead and dying component, affecting the availability of snags today.

White pine blister rust and fire exclusion has replaced most large trees, creating stands with smaller and younger size classes. Consequently, snag production is shifting from larger, longer-lived species to smaller, shorter-lived species, reducing habitat quality for pileated woodpeckers and other snag-dependent species.

### *Marten*

American martens are limited to conifer-dominated forests. In most of the studies of habitat use, martens were found to prefer late-successional stands of moist, coniferous forests, especially those with complex physical structure near the ground. Structure near the ground provides martens with protection from predators, below the snow access in the winter, and resting places. The martens most common prey species, red-backed voles and pine squirrels, are most abundant or nearly restricted to mature or late-successional forests. Drier forest types and those that lack structure near the ground are used little or not at all (Buskirk and Ruggiero 1994).

Marten were historically more abundant within the Interior Columbia Basin than currently; their decline corresponds with decreasing mature and old-growth habitat (Wisdom et al. 2000). The fire of 1926 reduced the suitability of the Wrenco Loop project area for martens. As forest stands have recovered from the fire, the area has become more suitable for marten. Today, the project area provides suitable habitat and marten likely are present.

### *White-tailed Deer*

White-tailed deer are distributed throughout the Idaho Panhandle National Forests, traditionally associated with a mixture of seral stages of vegetation. Climatic factors affect the seasonal variation of forage quality and quantity, accessibility to foraging areas and the thermal requirements of the animal (Pfingsten 1983). Winter range is the most critical feature of their habitat with winter being the most stressful period for big game because of the harsh weather conditions and limited food supply. During winter, animals are forced by increasing snow depths to travel downslope and concentrate on smaller, restricted winter ranges. Conversely, during summer, deer use a broader elevational range of habitats.

During winter, white-tailed deer are generally found on the valley bottoms and lower benches. Dense tree cover is probably the most critical component of critical winter range. As winter temperatures decrease and snow depths increase, animals select habitats to minimize energy expenditure and maintain a positive energy balance. Closed-canopy stands reduce the animals' heat loss and intercept snow, reducing understory snow accumulation and increasing foraging opportunities.

The project area is within the elevation and habitat type range of critical winter range (moderately dry Douglas-fir or grand fir, moist grand fir, western red cedar, and western hemlock with dense cover, occurring below 3,000 feet elevation). Approximately 50 percent or 501 acres of the project area fall within the characterization of critical winter range. Adjacent private land provides a mix of forest cover, varying from seedling and sapling stands to mixed-age, open-canopy stands created by recent timber harvest.

Of the 501 acres of critical winter range, 125 acres reside on dry habitats and 376 acres on moist habitats (figure 3-5, map packet). Historically, these dry sites provided only modest thermal cover values due to more frequent fire regimes that maintained conditions that are more open. Since the advent of fire suppression, tree densities have increased, creating stand conditions that are more closed. While these areas can provide favorable winter structure for white-tailed deer, they are not sustainable due to their predisposition to insects, disease, and other ecological pressures. Consequently, these drier sites are not considered vital to the management and analysis of winter range.

Regarding the 376 acres of moist forest, 335 acres are currently providing thermal cover. The remaining 41 acres are not contributing to thermal values because sufficient forest structure has been lost to insect and disease.

### Forest Land Birds

Neotropical migrant birds and resident songbirds are a diverse group of birds not addressed separately by species. Approximately 240 species of birds inhabit the Idaho Panhandle. Many are insectivorous, while others mainly eat seeds. Their habitat requirements vary from dry, rocky slopes to open meadows and other early stages of vegetation growth, to densely forested areas.

A diversity of vegetation and topography results in a diversity of bird species. Vegetation structure is an important factor determining habitat use by forest bird populations, supporting the concept that bird communities change as vegetation communities change. Any treatment, including no action, affects some species in this group at the expense of others. Idaho Partners in Flight has identified and prioritized four habitats that represent species of moderate to high vulnerability, and species with declining or uncertain population trends. These prioritized habitats include riparian habitat, non-riverine wetlands, sagebrush shrub, and dry ponderosa pine/Douglas-fir/grand fir forests (Idaho Partners in Flight 2000).

Several principles that would help maintain habitat and a healthy forest for a variety of bird species have been identified by Hejl (1994): encourage old-growth characteristics, leave snags and replacement trees, leave or plant the natural diversity of trees found in the area, burn and allow fires to happen in a manner similar to natural fire regimes, and mimic natural landscape patterns. While no single forest condition or structural type will benefit all species simultaneously, providing a mosaic of habitat conditions and age classes will capitalize on habitat values for many forest birds.

The fire of 1926, in combination with fire suppression and the introduction of blister rust, has led to today's vegetative conditions. Also, it is likely that past timber harvest activities removed some the dead and dying component in the dry ponderosa pine/Douglas-fir community, affecting the availability of snags. Today, the vast majority of the Wrenco Loop area is a homogeneous landscape dominated by Douglas-fir. Due to this uniform setting, the landscape lacks the vegetative species and structural diversity to attract a wide array of forest birds.

## Environmental Consequences

The following describes the potential impacts of implementing the proposed action or No Action Alternative on wildlife species that have the potential to occur within the Wrenco Loop project area. Species that are not known to occur or have negligible probability of occurrence in the project area because of lack of habitat are not addressed in detail in this section. Species known or likely to be present, discussed in the context of short-term (5 years), long-term (10 years), and cumulative impacts, are boreal toads, flammulated owls, fringed myotis, pygmy nuthatches, Northern goshawks, black-backed woodpeckers, pileated woodpeckers, martens, white-tailed deer, and forest land birds. Information presented in this section is based on scientific literature, wildlife databases, professional judgment, recent field surveys, and habitat evaluations. Impacts to species not addressed in detail are presented in a tabular summary (see table 3-13).

Table 3-10 lists the issue indicators that have been identified to measure potential impacts of alternatives on relevant wildlife species.

Habitat relations provide the foundation for accessing habitat suitability and predicting effects. Specific vegetation data was assembled and evaluated to determine its application to key habitat components that define suitable conditions. An interpretation of key habitat components for determining habitat suitability can be found in the project file – wildlife section.

**Table 3-10. Issue indicators used to measure effects**

| Species | Indicator |
|---|---|
| Boreal Toad | Quality of wetlands and terrestrial habitats |
| Flammulated Owl | Changes in habitat suitability (i.e., late forest structure and composition, large snag habitat) |
| Pygmy Nuthatch | Same as flammulated owl |
| Fringed Myotis | Same as flammulated owl |
| Northern Goshawk | Changes in habitat suitability (i.e. late forest structure, disturbance) |
| Black-backed Woodpecker | Quality and distribution of snag habitat |
| Pileated Woodpecker | Quality and abundance of large diameter trees and snags |
| Marten | Forest structure; abundance of downed woody material |
| White-tailed Deer | Changes to critical winter range |
| Forest Land Birds | Forest health and stand structure; habitat diversity |

## Boreal Toad

### *Methodology*

The potential effects on boreal toads were determined by predicting the change to breeding habitat (wetlands) and terrestrial habitat resulting from the proposed actions.

#### Analysis Area

Limited boreal toad breeding habitat exists within the Wrenco Loop project area, and since rearing of toadlets occurs within the wetland and adjacent wetland area, the Wrenco Loop project area is an effective analysis area to assess direct, indirect, and cumulative effects (Montana Department of Fish, Wildlife & Parks [b], no date).

### *Alternative A – Proposed Action*

#### Direct and Indirect Effects

Implementation of Alternative A may result in the temporary disturbance of boreal toads and boreal toad habitat within the treatment areas. There is the possibility that individual toads could be temporarily displaced or killed due to vehicles, tree removal, skid trails, road construction, or underburning. This disturbance would be short term and boreal toad activity would resume in the area after project completion. Boreal toads use a variety of upland areas, so the change in vegetation structure should have no long-term effect. Indirect effects to breeding habitat have the potential to occur if there is increased sediment delivery to wetlands and waterways as a result of increased roads and tree removal. However, with Best Management Practices (BMPs) in place to protect water quality and fish habitat (see hydrology analysis and Appendix A) and Inland Native Fish Strategy (INFS) protection measures implemented to protect waterways and wetlands (see Appendix B), impacts to boreal toads should be minimal.

Although implementation of Alternative A would likely impact individual boreal toads and some boreal toad habitat, this Alternative would not contribute to a trend towards federal listing or cause a reduction of viability to the population or species.

### Cumulative Effects

No present or reasonably foreseeable activities would contribute cumulative impacts with the implementation of Alternative A. As mentioned previously, past road building likely impacted boreal toad habitat. Since the proposed action protects wet and riparian areas and would only have minor short-term impacts to individuals, cumulative effects would be negligible. The additive effects from road decommissioning and culvert removal would also be negligible or inconsequential because of its extremely low magnitude. Only the entrance points of the road would be obliterated along with the removal of two culverts.

## *Alternative B – No Action*

### Direct and Indirect Effects

The No Action alternative would not impact boreal toads. There would be no alteration of upland habitats or breeding habitat with this alternative.

### Cumulative Effects

Since this alternative does not result in effects to boreal toads or alteration of boreal toad habitat; there would be no cumulative effects.

## *Consistency with Forest Plan and Other Regulations*

Both alternatives comply with Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species Lists to prevent further declines in populations.

# Flammulated Owl, Pygmy Nuthatch, and Fringed Myotis

## *Methodology*

Effects to pygmy nuthatch and fringed myotis are represented by the effects analysis for flammulated owl because they share similar habitat requirements; relatively open stands of mature or late-seral ponderosa pine forests with a complement of large snag habitat.

The potential effects on flammulated owl and its habitat were derived from the Forest Timber Stand database (TSMRS) and 2004 field review notes (located in the project file – vegetation section) to determine the predicted change in habitat suitability resulting from each alternative. Capable habitat was decided by habitat type, and in some cases, aspect and elevation. Suitable habitat was determined by stand structure and composition (modeling rules and assumptions can also be found in the project file – wildlife section).

### Analysis Area

The Wrenco Loop project area is of adequate size to represent direct, indirect, and cumulative effects analysis area that may occur for flammulated owls. The average size home range for flammulated owls has been found to be approximately 40 acres (Hayward and Verner 1994).

## *Alternative A – Proposed Action*

### Direct and Indirect Effects

Alternative A would treat approximately 145 acres or 60 percent of the capable habitat within the project area, including 22 acres (of the total 36) that are characterized as suitable flammulated

owl habitat (table 3-11, figure 3-6 in map packet). Trees on these acres would be harvested using a thinning prescription, except for 35 acres where a regeneration prescription would be applied.

One of the objectives of this alternative is to increase shade-intolerant seral species, such as ponderosa pine, western larch, and white pine, and create a more open stand of mature trees. The thinning prescription would improve flammulated owl habitat by managing for an older age class of ponderosa pine and Douglas-fir trees. Habitat improvement would also result from opening up the existing canopy and providing for understory shrub development, thereby improving flammulated owl foraging habitat. Conversion and maintenance of seral species in harvested stands would provide for long-term maintenance of forest habitats preferred by the species.

**Table 3-11. Flammulated owl habitat in areas proposed for treatment.**

| | | | |
|---|---|---|---|
| **Capable Habitat** | *Suitable* | Thinning Rx | 22 acres |
| | | Regeneration Rx | 0 acres |
| | *Not suitable* | Thinning Rx | 88 acres |
| | | Regeneration Rx | 35 acres |
| | | Total: | 145 acres |

The 35 acres associated with regeneration harvest includes portions of stands that are showing signs of advanced insect and disease. These mortality agents will continue to exert influence, resulting in a loss of sufficient forest structure to maintain or promote suitable habitat conditions for flammulated owls. Converting these high-risk stands through a regeneration prescription would provide an opportunity to alter species composition and favor the longer-lived, more disease resistance species like ponderosa pine. Therefore, harvesting 35 acres with a regeneration prescription would not adversely affect suitability of flammulated owl habitat. This activity would promote the restoration of more open grown, older forests of ponderosa pine/Douglas-fir on these sites and lead to long-term habitat stability for flammulated owls, as well as pygmy nuthatches and fringed myotis.

Some harvest of existing snags is possible due to safety issues or other logging system requirements. A reduction in snag densities over the short-term may impact nesting habitat for flammulated owls. However, this impact would only apply to those acres that are currently considered suitable for nesting. Design features (Chapter 2) would focus on the protection and retention of large-diameter snags, especially ponderosa pine, thereby minimizing these impacts. Over the long term, implementation of Alternative A would result in high quality, large-diameter snags that would enhance nesting habitat for flammulated owls and northern flickers (primary excavators of cavities used by flammulated owls), and improve habitat for pygmy nuthatches and fringed myotis.

The implementation of Alternative A may impact individual flammulated owls, pygmy nuthatches, fringed myotis, and their habitat; however, this alternative would not contribute to a trend towards federal listing or cause a loss of viability to the population or species.

### *Alternative B – No Action*

#### Direct, Indirect, and Cumulative Effects

Alternative B would result in no direct impacts to flammulated owls; however, there would be indirect effects. As the current trend continues within forest stands, the stands would continue to decline in health and vigor and would become increasingly crowded with immature trees. In

addition, as the forest stands continued to have species such as ponderosa pine, western larch and white pine replaced by shade-tolerant species, habitat for flammulated owls, pygmy nuthatches, and fringed myotis would further decline.

Alternative B would not result in an immediate change in snags or suitable habitat. However, as the stands become crowded with immature trees, the available snags will eventually shift to small diameter snags that are not as desired by cavity nesters. There would also be an increased potential for fire and disease.

Past timber harvest likely removed trees that would have contributed to quality snag habitat over time. Combined with the indirect effects on snags described for this alternative, not treating the stands would have a cumulative effect with past harvest on decreasing quality snag habitat for flammulated owls, pygmy nuthatches and fringed myotis.

Implementation of Alternative B would likely impact individual flammulated owls, pygmy nuthatches, fringed myotis, and their habitat; however, this Alternative would not contribute to a trend towards federal listing or cause a loss of viability to the population or species.

### Cumulative Effects Common to Both Alternatives

Fire suppression activities within the project area have had the greatest impact on flammulated owls. Reduced natural fire frequency has reduced the quality of flammulated owl habitat. Current and reasonably foreseeable activities are not expected to have a negative effect on flammulated owls. No additional activities would contribute to cumulative effects on flammulated owls, pygmy nuthatches, and fringed myotis.

### *Consistency with Forest Plan and Other Regulations*

Both alternatives comply with the Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species Lists to prevent further declines in populations. Proposed activities would meet the Forest Plan and objectives for managing snag habitat.

## Northern Goshawk

### *Methodology*

The potential effects on the northern goshawk and its habitat were derived from the Forest Timber Stand database (TSMRS) and 2004 field review notes (located in the project file – vegetation section) to determine the predicted change in habitat suitability resulting from each alternative.

### Analysis Area

The analysis area for direct, indirect, and cumulative effects is identified as a 6,000-acre area, which includes the 1,010 acres of National Forest land within the project area, and approximately 5,000 acres of private land adjacent to the project area. Nesting goshawks in the Rocky Mountains often have 6,000-acre home ranges (Reynolds et al. 1992). The analysis area is of adequate size to evaluate the impacts of the alternative on goshawks utilizing the project area.

### *Alternative A – Proposed Action*

## Direct and Indirect Effects

Alternative A would treat approximately 467 acres or 61 percent of capable goshawk nesting habitat within the project area of which there are no suitable acres (table 3-12, figure 3-7 in map packet). Trees would be harvested using a thinning prescription on 414 acres. Of the remaining 53 acres, a regeneration harvest prescription would be applied.

**Table 3-12. Goshawk habitat is areas proposed for treatment.**

| | | | |
|---|---|---|---|
| **Capable nesting habitat** | *Suitable* | Thinning Rx | 0 acres |
| | | Regeneration Rx | 0 acres |
| | *Not suitable* | Thinning Rx | 414 acres |
| | | Regeneration Rx | 53 acres |
| | | Total: | 467 acres |

Thinning would reduce canopy cover initially; however, change in canopy cover, in most areas, would not fall below acceptable levels for goshawks (50-70 percent) (Reynolds et al. 1992).

Treated areas would trend from crowded, immature stands to open stands with larger, more mature trees. This trend would ultimately be beneficial to goshawks by producing larger trees and increasing the desirability of foraging areas by removing congestion of dense understory vegetation. Over the long term, this alternative would have the potential to move approximately 414 acres of habitat toward more suitable conditions for goshawk nesting, resulting in maintenance of long-lived, seral forest habitat on the treated areas. Selective harvest would promote forest species and structure that provides desirable goshawk nesting and foraging habitat.

The high incidences of disease and insect outbreaks within some stands have affected their capacity to hold sufficient structure and contribute to future habitat suitability. Regenerating these stands to disease resistant species that are ecologically more compatible with historic vegetative patterns would help stabilize nesting habitat in the future. Consequently, harvesting 53 acres of unsuitable habitat with a regeneration prescription, including incidental pockets of root disease or other forest health problems, would not adversely affect habitat suitability for goshawks.

## Cumulative Effects

Past activities that have occurred within National Forest land include timber harvest, fire suppression, road development, and recreation. Predominant past activities on the adjacent private lands include road development, residential development, timber harvest and fire suppression. Past activities and the predominant current activities are expected to continue into the future. Logging and residential development are the activities occurring in the analysis area with the greatest impact to goshawks. The activities occurring on private lands could further degrade the quality of nesting habitat and threaten the viability of a nesting pair. Although the private land activities occurring within the cumulative effects area may have negative impacts on goshawks, the implementation of Alternative A would not result in negative impacts and would ultimately improve nesting habitat. Design features would be effective in protecting nest sites and the treatments would result in an increase in nesting and foraging habitat.

Consequently, Alternative A may impact individual goshawks or their habitat, but would not cause a local or regional change in habitat quality or population status.

### *Alternative B – No Action*

#### Direct and Indirect Effects

This alternative would have no direct impacts on goshawks or their habitat. However, the No Action Alternative would have indirect effects by allowing forest stands to continue to increase in stem densities and understory congestion; thereby, detracting from its attractiveness to goshawks in some areas. Stands in the project area would continue to decline in health and vigor and would become increasingly crowded with immature trees, ultimately resulting in increased risk of severe wildfire that could remove forest stands used by goshawks.

#### Cumulative Effects

Past activities that have occurred within National Forest lands include logging, fire suppression, road development, and recreation. Predominant past activities on the adjacent private lands include road development, residential development and timber harvest. Past activities are the predominant current activities and are expected to continue into the future. Logging and residential development are the activities occurring in the analysis area with the greatest impact to goshawks. The activities occurring on private lands could further degrade the quality of nesting habitat and threaten the viability of the nesting pair. The cumulative impacts of Alternative B may result in a degradation of goshawk habitat; however, because goshawks have a large home range and have the ability to reposition, Alternative B may impact individual goshawks or their habitat, but would not cause a local or regional change in habitat quality or population status.

### *Consistency with Forest Plan and Other Regulations*

Both alternatives comply with Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species Lists to prevent further declines in populations.

## Black-backed Woodpecker

### *Alternative A – Proposed Action*

#### Direct and Indirect Effects

Alternative A would result in some reduction in snag habitat in the project area over the short-term. However, Alternative A incorporates wildlife tree retention measures to mitigate the impacts to snag habitat. Snag retention objectives on dry sites would be four snags per acre with replacement of eight live trees per acre from the largest trees. On moist sites, snag retention objectives would be retention of six snags and replacement of 12 live trees per acre from the largest trees. Studies indicate that this ratio of snags would provide habitat to maintain viable woodpecker populations (Bull et al. 1997).

Indirect impacts associated with the implementation of Alternative A would be improved health of the forest stands within the project area and, thereby, reduced potential for high intensity fires. This would indirectly reduce the probability of a fire-induced surge of snag habitat for black-backed woodpeckers.

The implementation of Alternative A would have minor short-term effects on black-backed woodpeckers or black-backed woodpecker habitat that is already considered marginal. Consequently, this alternative would not indicate a local or regional change is quality of habitat or

population status and would not contribute to a trend towards federal listing or cause a loss of viability to the population or species.

### Cumulative Effects

The cumulative effects area for black-backed woodpeckers is identified as the project area. Research suggests that typical home range size for black-backed woodpeckers is approximately 870 acres (Dudley and Saab 2003; Montana Partners in Flight 2000). The Wrenco Loop area includes approximately 1,000 acres of National Forest land; therefore, the project area would be able to capture the impacts of the cumulative effects.

The habitat that exists today within the Wrenco Loop area is a result of past fires, fire suppression, road development and logging. Current activities occurring within the project area are expected to continue into the future. These activities, displayed in table 3-1, include post and pole cutting, hunting, ATV recreation, and urban development along project area boundaries. Cumulative effects as a result of this alternative are expected to be discountable and insignificant because they would have immeasurable impacts to preferred habitats.

## *Alternative B – No Action*

### Direct and Indirect Effects

The implementation of the No Action alternative would not result in an immediate change in snags or suitable habitat for black-backed woodpeckers. However, as succession continued in the forest stands and if management techniques were not implemented, forest stands would continue to decline in health and vigor, ultimately resulting in high levels of tree mortality. As species such as ponderosa pine, western larch and white pine are replaced by shade-tolerant species, the stands would accumulate high fuel loads and an unhealthy condition, putting them more at risk for intense fire or disease outbreaks. The disease outbreak or fire would result in a temporary increase in black-backed habitat.

Implementation of alternative B would likely impact individual black-backed woodpeckers or black-backed woodpecker habitat; however, this Alternative would not contribute to a trend towards federal listing or cause a loss of viability to the population or species.

### Cumulative Effects

Implementation of Alternative B would have minimal impacts on black-backed woodpecker habitat and other activities on or near the project area would not meaningfully contribute to cumulative impacts.

## *Consistency with Forest Plan and Other Regulations*

Both alternatives comply with the Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species Lists to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act. Proposed activities would meet the Forest Plan and objectives for managing snag habitat.

## Pileated Woodpecker

### *Methodology*

Potential effects on pileated woodpecker and other snag-dependent species were determined by estimating the change and distribution of quality snag habitat that could result from the implementation of the alternatives.

#### Analysis Area

Pileated woodpeckers typically nest in areas of 50 to100 acres of continuous forest; therefore, the project area will be of adequate size to evaluate the direct, indirect, and cumulative effects.

### *Alternative A – Proposed Action*

#### Direct and Indirect Effects

Some harvest of existing snags is possible due to safety issues or other logging system requirements. A reduction in snag densities over the short-term may impact nesting habitat; however, design features for snag retention (discussed in Chapter 2) would minimize these impacts.

While some of the existing areas proposed for treatment currently may provide nesting (snags) and/or foraging habitat for pileated woodpeckers, the harvest prescriptions as designed would provide for long-term maintenance of seral species such as white pine, ponderosa pine, and western larch. Western larch and ponderosa pine stands with large-diameter snags are considered high-quality habitat for this species. The implementation of Alternative A would improve pileated woodpecker nesting habitat within the project area by increasing high quality, large-diameter snags in the long term.

### *Alternative B – No Action*

#### Direct, Indirect, and Cumulative Effects

Alternative B would result in no direct impacts to pileated woodpeckers; however, there would be indirect effects. Stands in the project area would continue to decline in health and vigor and would become increasingly crowded with immature trees, ultimately resulting in increased risk of severe wildfire that could remove mature forest stands utilized by pileated woodpeckers.

Alternative B would not result in an immediate change in snags or suitable habitat. However, as the stand becomes crowded with immature trees, snags would eventually shift to small diameter snags that are not suitable for pileated woodpecker nesting.

The fire of 1926 and past timber harvest likely removed trees that would have contributed to quality pileated habitat over time (quality snags and mature forest). Combined with the indirect effects on snags and forest conditions described for this alternative, not treating the stands would have a cumulative effect with the fire and past harvest on decreasing quality snag habitat for pileated woodpeckers.

### *Cumulative Effects for Both Alternatives*

Fire suppression activities within the project area have had the greatest impact on pileated woodpecker habitat within the analysis area by resulting in stands that have a large number of immature trees and a reduced amount of large-diameter trees and snags.

Current and reasonably foreseeable actions (displayed in table 3-1) are not expected to have a negative effect on pileated woodpeckers.

Alternatives A and B may impact individual pileated woodpeckers and their habitat, but would not indicate a local or regional change in habitat quality or population status.

### *Consistency with Forest Plan and Other Regulations*

Both alternatives would meet the Forest Plan and objectives for managing snag habitat. The Forest Plan requires that habitat must be maintained to protect and maintain viable populations. The proposed activities would not impact viable populations of pileated woodpeckers and would ultimately improve the site for pileated woodpeckers.

## Marten

### *Methodology*

The potential effects on marten were determined by predicting the change in habitat suitability resulting from each alternative. Habitat suitability was derived from the Forest Timber Stand database (TSMRS) and 2004 field review notes (located in the project file – vegetation section) to determine the predicted change in habitat resulting from each alternative. Capable habitat was decided by habitat type. The suitability of capable habitat was determined by stand structure and the predicted amounts of complex woody structure near the ground.

#### Analysis Area

The direct, indirect, and cumulative effects analysis area has been identified as the project area. Martens commonly have home ranges that span several square miles (Clark and Casey 1989) and the project area is of adequate size to analyze the effects of the proposed alternatives on martens and marten habitat.

### *Alternative A – Proposed Action*

#### Direct and Indirect Effects

In the short term, marten may avoid areas where regeneration harvest would occur, but as planted trees grow, these areas would again become suitable for use. On the areas proposed for underburning, distribution and abundance of downed wood would likely be reduced, though typically the larger diameter logs are able to withstand burning associated with fuel treatment projects. Design features related to down woody material would help compensate for this loss (Chapter 2). In addition, these impacts would be further mitigated by leaving one to three slash piles unburned per acre in grapple pile units providing short-term foraging habitat for marten.

Marten habitat would be indirectly affected by long-term creation and maintenance of large-diameter, seral forest species. Implementation of Alternative A would reduce the immature trees and produce favorable habitat conditions of larger, more mature trees.

#### Cumulative Effects

The dominant past, present and reasonably foreseeable activities that contribute to cumulative effects include fire suppression, timber harvest, road construction and recreational activities. Cumulative effects associated with Alternative A would result in a short-term decline in the quality of marten habitat; however, as a result of increased forest health and vigor over the long term, the quality of marten habitat would be improved in the long term. Alternative A may impact

individual martens and their habitat, but would not indicate a local or regional change in habitat quality or population status.

### *Alternative B – No Action*

#### Direct and Indirect Effects

Alternative B would result in no direct impacts to martens; however, there would be indirect effects. With continuation of current forest management, stands in the project area would continue to decline in health and vigor and would become increasingly crowded with immature trees. This would not provide the large complex forest structure that marten need, including the larger down woody material, resulting in a reduction in the quality of marten habitat.

#### Cumulative Effects

The cumulative effects associated with Alternative B would be a decrease in the quality of marten habitat within the project area as the forest stands continue to have mature trees decline and forest stands become increasingly crowded with dense stands of immature trees.

Alternative B may impact individual martens and their habitat, but would not indicate a local or regional change in habitat quality or population status.

### *Consistency with Forest Plan and Other Regulations*

The Forest Plan requires that habitat must be maintained to protect and maintain viable populations. The proposed activities would not impact viable populations of martens and would ultimately improve the site for martens. Both alternatives would meet and exceed the Forest Plan guidelines for snag and woody debris management.

## White-tailed Deer (Winter Range)

### *Methodology*

Effects on white-tailed were determined by predicting the changes to critical winter range for each alternative.

Critical winter range is the most limiting aspect of white-tailed deer habitat. Key components of critical winter range are stands that consist of medium to larger trees with at least 60 percent canopy cover (thermal cover), which are needed to ameliorate heat loss and energy expenditure during severe winter periods.

#### Analysis Area

White-tailed deer move to areas defined as critical winter range when snow depths interfere with access to forage. The direct, indirect, and cumulative effects analysis area for white-tailed deer critical winter range is identified as the Johnson Creek watershed (see figure 3-9 in the map packet, which shows the cumulative effects area for the aquatics analysis, and the Wildlife section of the project file for map). This area contains a significant portion of white-tailed deer winter range.

### *Alternative A – Proposed Action*

#### Direct and Indirect Effects

Alternative A would affect approximately 204 acres or 54 percent critical winter range habitat through mostly thinning treatments. Of those treated acres, 137 acres would remain as functioning thermal cover. Of the remaining 67 acres, there would be no change to 41 acres from the existing condition, whereas, only 26 acres would be converted to a non-thermal condition by vegetation treatment (figure 3-8, map packet).

Most of the critical winter range would be thinned, resulting in some form of canopy reduction. However, the resulting canopy cover would still meet the criteria for suitable winter range cover conditions. As trees within the treated stands are released from competition with dense understory trees, canopy cover would recover and the stand would provide improved winter range conditions over time.

#### Cumulative Effects

Activities that could contribute to cumulative effects include timber harvest on private lands, hunting, residential development, road construction, and recreational activities (snowmobile use). Although the fire of 1926 removed elements of critical winter range, those features have since recovered. Past logging in the project area did not have an effect on winter range (see Vegetation section). Activities on adjacent private lands have modified winter range through removal of overstory vegetation, resulting in reduced thermal cover and increased winter stress on white-tailed deer. Residential development on adjacent private lands has also diminished amounts of winter range available to deer adjacent to the project area.

During implementation of project activities, white-tailed deer could be impacted by the combined actions of Alternative A and activities outside the project area. Local reductions in white-tailed deer may result from cumulative effects of ongoing activities in the Johnson Creek drainage. However, the additive effects from the project would likely be inconsequential and short term. Given the relatively small area that would be affected by Alternative A, short-term losses would be negligible or minor. Consequently, Alternative A may impact portions of white-tailed deer critical winter range, but would not contribute to a local or regional change in habitat quality or population status.

### *Alternative B – No Action*

#### Direct and Indirect Effects

Alternative B would not result in any direct impacts to white-tailed deer winter range; however, indirect changes to forest stand structure would occur. As succession continued within the forest stands, canopy cover would continue to increase and this would improve thermal cover conditions. However, as the stands decreased in health and vigor, the area would become more susceptible to fire, disease and insect out breaks, which would in turn, open canopies and decrease the value thermal cover for white-tailed deer.

#### Cumulative Effects

This alternative would have minimal cumulative effects to white-tailed deer winter range. Cumulative effects from the no action alternative may occur over the long term as the vegetation structure changes; however, given the relatively small area that would be affected by this alternative, impacts to white-tailed deer critical winter range would be insignificant regionally and would not result in a significant change on habitat quality or populations on a regional level.

### *Consistency with Forest Plan and Other Regulations*

Both alternatives comply with the Forest Plan regarding big game management. White-tailed deer critical winter range will be maintained.

## Forest Land Birds

### *Methodology*

Bird species differ in habitat requirements and their responses to management activities. Due to the sizable number of species that can occur in a forested landscape, it is impractical and nearly impossible to take a species-by-species approach. Rather, this analysis looks at the avian community as a whole, in the context with the surrounding landscape. It addresses priority habitats identified by Idaho Partners in Flight (2000) and discusses how management activities, or even a lack of management activities, can affect bird species composition and richness.

#### Analysis Area

The direct, indirect, and cumulative effects analysis area is defined as the project area. Many forest land birds have relatively small home ranges and the project area is of adequate size to evaluate the impacts on these species.

### *Alternative A – Proposed Action*

#### Direct and Indirect Effects

Two priority habitats occur in the project area: riparian habitat and dry ponderosa pine/Douglas-fir/grand fir forests. Due to fire suppression and a decline in health and vigor within the forest stands, these habitats are declining within the project area. One of the objectives of Alternative A is to promote the restoration of dry ponderosa pine/Douglas-fir forests and encourage the long-term stability of dry habitats by altering species composition and treating overcrowded conditions of shade-tolerant trees. The restoration of this habitat type would increase the vegetative diversity within the project area and would ultimately increase the diversity in habitat for forestland birds.

Riparian areas are critical areas for forest land birds, especially during nesting season. Riparian habitats would not be impacted by the implementation of this alternative as BMPs and INFS standards would be implemented, thereby protecting these areas.

Short-term direct impacts to forestland birds currently using the area would occur as a result of temporary disturbance caused by underburning, tree removal and road construction. A short-term loss in the productivity of nesting birds within the project area may occur as a result of spring underburning. However, over the long term, this would be offset by increased vegetative diversity, thus providing more niches for a greater abundance and diversity of birds.

For bird species that use snag habitat, there would be a reduction in snag densities over the short-term; however, design features for snag retention (discussed in Chapter 2) would minimize impacts. Over the long term, implementation of Alternative A would result in high quality, large-diameter snags that would enhance habitat for those snag dependent species.

#### Cumulative Effects

Historic fires, fire suppression and logging have resulted in more homogenous species compositions and structures, thereby decreasing diversity. Table 3-1 displays the current and reasonably foreseeable actions to occur within the project area. These activities will not change

composition and structure enough to have substantial effects. Because the implementation of Alternative A would ultimately improve forestland bird habitat by increasing vegetative diversity and restoring dry ponderosa pine/Douglas-fir/grand fir forests, cumulative impacts would be negligible.

Alternative A may impact individual forest land birds and habitat, but would not contribute to a local or regional change in habitat quality or population status.

### *Alternative B – No Action*

#### Direct and Indirect Effects

Alternative B would result in no direct impacts to forestland birds; however, there would be indirect effects. As the current trend continues stands would continue to decline in health and vigor and would become increasingly crowded with immature trees. This trend would result in decreased vegetative diversity and, ultimately, decreased habitat for forestland birds. Additionally, as the forest stands continue to become crowded with immature trees, fuel loads increase and the probability for a high intensity fire increases, resulting in reduction in habitat for many forest land birds.

In addition, as the forest stands continue to become crowded with immature trees, fuel loads would increase and the probability for a high-intensity fire would increase, resulting in reduction in habitat for many forest land birds.

#### Cumulative Effects

Cumulative effects associated with Alternative B would be the decline of health and vigor in forest stands within the project area combined with development and harvesting of private lands.

Although Alternative B may impact individuals and habitat within the project area, it would not contribute to a local or regional change in habitat quality or population status.

### *Consistency with Forest Plan and Other Regulations*

While the Forest Plan does not address specific standards or guidelines for managing forest land birds, it does provide guidance for managing snag habitat and old growth. This project would exceed Forest Plan standards for snag management and would not adversely impact inventoried old growth stands.

## *Summary of Effects*

Table 3-13 displays the determination of effects for TES species and MIS.

**Table 3-13. Effects determinations for species at risk**

| Species | Alternative A | Alternative B |
|---|---|---|
| Grizzly Bear (threatened) | No Effect | No Effect |
| Canada Lynx (threatened) | No Effect | No Effect |
| Bald Eagle (threatened) | No Effect | No Effect |
| Gray Wolf (threatened) | No Effect | No Effect |
| Woodland Caribou (endangered) | No Effect | No Effect |

| Species | Alternative A | Alternative B |
|---|---|---|
| Black-backed Woodpecker (sensitive) | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species |
| Black Swift (sensitive) | No Impact | No Impact |
| Coeur d'Alene Salamander (sensitive) | No Impact | No Impact |
| Boreal Toad (sensitive) | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | No Impact |
| Fisher (sensitive) | No Impact | No Impact |
| Harlequin Duck (sensitive) | No Impact | No Impact |
| Flammulated Owl (sensitive) | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species |
| Pygmy Nuthatch (sensitive) | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species |
| Fringed Moytis (sensitive) | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species |
| Northern Bog Lemming (sensitive) | No Impact | No Impact |
| Peregrine Falcon (sensitive) | No Impact | No Impact |
| Common Loon (sensitive) | No Impact | No Impact |
| Townsend's Big-eared Bat (sensitive) | No Impact | No impact |
| Wolverine (sensitive) | No Impact | No Impact |
| Northern Goshawk (sensitive & MIS) | May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species |
| Pileated Woodpecker (MIS) | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status | May impact individuals and habitat, but would not likely indicate a local or regional change in habitat quality or population status |
| Marten (MIS) | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status |
| White-tail Deer Winter Range | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status |
| Forest Land Birds | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status | May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status |

# Soils

## *Regulatory Framework*

The regulatory framework providing direction for protecting a site's inherent capacity to grow vegetation comes from the following principal sources:

- Multiple Use-Sustained Yield Act of 1960
- National Forest Management Act of 1976 (NFMA)
- Code of Federal Regulations for Forest Planning (36 CFR 200.1)
- Forest Plan and Regional Soil Quality Standards (FSH 2509.18)

The Multiple Use-Sustained Yield Act of 1960 directs the Forest Service to achieve and maintain outputs of various renewable resources in perpetuity without permanent impairment of the land's productivity. Section 6 of the NFMA charges the Secretary of Agriculture with ensuring research and continuous monitoring of each management system to safeguard the land's productivity. The Code of Federal Regulations for Forest Planning requires the Forest Service to measure effects of prescriptions, including "significant changes in land productivity" (36 CFR Part 200, Section 1, 1987). To comply with requirements, the Chief of the Forest Service charged each Forest Service Region to develop soil quality standards for detecting soil disturbances indicating a loss in long-term productive potential. These standards and guidelines are built into Forest Plans.

Management direction in the Forest Plan (p. II-17) is to manage the soil resource to maintain long-term productivity. Forest Plan objectives and standards (pp. II-32 and 33) include:

- Management activities on Forest lands will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. This will be accomplished using technical guidelines developed in conjunction with the soil survey and Best Management Practices necessary to protect soil productivity and minimize sedimentation.
- Soil-disturbing management practices will strive to maintain at least 80 percent of the activity area in a condition of acceptable productivity potential for trees and other managed vegetation. Unacceptable productivity potential exists when soil has been detrimentally compacted, displaced, puddled, or severely burned as determined in the project analysis.
- Projects should strive to maintain sufficient large woody debris to maintain site productivity.
- In the event of whole-tree yarding, provisions for maintenance of sufficient nutrient capital should be made in the project analysis.

The Regional Soil Quality Standards (R-1 Supplement 2500-99-1) were revised in November 1999. Manual direction recommends maintaining 85% of an activity area's soils at an acceptable productivity potential with respect to detrimental impacts, including the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. This recommendation is based on research indicating that a decline in productivity would have to be at least 15% to be detectable (Powers, 1990). In areas where more than 15 percent detrimental soil conditions exists from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. These standards do not apply to intensively developed sites such as permanent roads, mines, developed recreation and administrative sites.

## *Methodology*

### Analysis Area

The analysis area for direct, indirect, and cumulative effects on soils is the project area. The analysis area for soil resources is each timber stand unit (activity area), and associated temporary roads and landings. Since direct and indirect effects on soils are measured within each activity area, the cumulative effects area for the soil resource is the portion of each activity area in the Wrenco Loop project where previous management has occurred. Existing classified National Forest system roads are designated lands and, as such, the loss of soil productivity due to their construction will not be considered in the cumulative effects analysis.

### Analysis Methods

The exiting condition for the soil resources was determined using Niehoff's (2002) guidelines for soil NEPA analysis, the Soil Disturbance Spreadsheet Model (hereafter referred to as the spreadsheet model), and field verification. The spreadsheet model evaluates detrimental disturbance on proposed harvest units for each harvest method based on empirically derived coefficients that were obtained and averaged from numerous monitored sites throughout the Forest. The model is limited to the harvest and slash disposal methods for which coefficients have been determined, and its coefficients assume that best management practices (BMPs) have been implemented since 1990. The model does not account for changes in soil type or the recovery of soils over time from existing previous harvest activities.

The protocol for applying the Soil Disturbance Model is included in the "Soil NEPA Analysis Process and Source of Soil Disturbance Model Coefficients" (Niehoff 2002). As part of this protocol, the model is linked to the Region 1 Timber Stand Management Record System (TSMRS) by stand identification numbers. For the Wrenco Loop project, established timber stands of the TSMRS that are located within the project area but extend beyond the activity area were clipped at the activity area boundary and the areas within the boundary were recalculated for use in the model.

Some previous harvest was identified in the TSMRS record for the project area, but some past harvest in the earlier part of the 20$^{th}$ century had no historical records. For these reasons, the spreadsheet model was not used to determine existing condition. Field verification determined that past harvest occurred between the late 1940s and the mid-1960s in the form of intermittent salvage and overstory removal harvests. In addition, 2.5 miles of road were constructed between 1965 and 1966 (see Vegetation section and table 3-1 for a list of past actions).

Preliminary analysis of proposed harvest activities were evaluated using the spreadsheet model, which resulted in six stands that were identified for field review because potential impacts could be above 10 percent. During several visits, the Forest Soil Scientist reviewed all of these stands (and others) to verify existing soil conditions by conducting the "Onsite Assessment Method" outlined in Niehoff (2002) in the fall of 2004 (see project file – soils section for data).

In January, 2005, updated acreages and changes of proposed logging prescriptions prompted a recalculation of the spreadsheet model. As a result, potential detrimental disturbance predictions in one additional stand (643-04-013) increased above 10%. Since this stand was previously not identified for field review, it had not been visited in 2004. The soil scientist then arranged for the stand to be reviewed while winter conditions allowed access (see memo to Dillon, project file – soils section).

Additional information was derived from a previous field visit (Niehoff 1996), published literature, aerial photography, and GIS data. Natural erosion and sediment production hazards were gathered from landtype descriptions in the Idaho Panhandle National Forests Land Systems Inventory (USDA Forest Service 1999d).

## *Affected Environment*

### Geology and Soils

The project area consists of a mosaic landscape that includes ridges, moist to wet draws and depressions, and gentle to moderately steep side slopes. The bedrock geology is comprised of medium to coarse-grained granodiorite that was intruded as part of the Kaniksu batholith between 46 to 51 million years ago (Miller et al. 1999). The area was visited by at least two ice advances over the past 50,000 years that covered all but the tops of the highest mountains in north Idaho. As the ice sheets moved over the mountains, they scoured material in some areas, and deposited and compacted tills in others, reshaping the landscape through the rounding of ridges and widening of valleys.

The project area, especially in the north, shows very distinct ridge and swale topography. Ridges are generally steep, rocky, and inaccessible and consist of skeletal (rocky) to moderately deep soils with a relatively shallow volcanic ash surface layer (7 to 14 inches deep). The sideslopes, draws, and depressional areas contain exceptionally deep ash-capped soils (15 to 30 inches deep of silt loam texture with an average of 5 to 30 percent rock fragments). The subsoil and substratum are forming in granitic till and tend to be extremely variable in texture and rock content, which ranges between 10 to 80 percent. A restrictive layer of dense till occurs at a depth of 24 to 60 inches and may inhibit water movement. Bare rock outcrop is common along the ridges in the northern portion of the project area and frequently occurs in conjunction with drier habitat types.

### Reference Condition

#### *Soils and Productivity*

The most productive part of the soil occurs near the surface at the contact between the forest litter and the mineral soil. Here, the litter has been highly decomposed into dark colored amorphous material, which is the richest part of the soil. This layer is frequently only a few inches thick, but its presence is much more important than its thickness would indicate. This organic-matter-rich layer contains most of the soil nitrogen, potassium, and mycorrhizae, which must be present for a site to be productive.

Underneath this organic horizon is volcanic ash, which occurs as the surface layer of the mineral soil. The volcanic material originated from several of the Cascade volcanoes with most of the ash originating from Mt. Mazama (Crater Lake) in Oregon about 6,700 years ago. The top part of the ash is usually enriched in organic matter that also contributes nitrogen, potassium, and mycorrhizae to this part of the soil. The ash has a high water- and nutrient-holding capacity, both of which are important for soil productivity. The lower part of the volcanic ash has less organic matter and is not as fertile.

Below the volcanic ash, the subsoils and substratum tend to be medium to coarse textured in the granitic glacial tills. These young glacial soils are very weakly weathered and generally have a high component of rock fragments, although this can be quite variable, particularly in the alluvial bottoms.

The weathered granitics and deep volcanic ash surface layer are very productive but highly susceptible to compaction, especially under wet conditions. Long-term damage from burning may also occur if soil moistures are not sufficient to protect soil organisms when dry soil conditions exist. This part of the soil is most easily disturbed by management activities.

Retaining coarse woody debris (CWD) and organic matter is important to maintaining the soil's most productive layer. CWD is defined as woody material derived from tree limbs, boles, and roots greater than three inches in diameter and in various stages of decay. It performs many physical, chemical, and biological functions in forest ecosystems and is also a key habitat component for many wildlife species and for stream ecology (Graham 1994). Because CWD is such a valuable part of a functioning ecosystem, a portion of the material must be maintained to ensure that organic matter is recycled for long-term productivity.

### *Detrimental Soil Impacts*

Detrimental soil impacts are defined as the proportion of an activity area that may be subjected to compaction, displacement, rutting, surface erosion, soil mass movement, or severe burning due to a particular management activity such as harvest or fuels treatment, exclusive of committed resources such as system roads. The soils in an activity area are considered detrimentally disturbed when the following soil conditions exist as a result of Forest practices:

- For volcanic ash-influenced surface soils, compaction results in a 20 percent or more increase in bulk density, or a 50 percent reduction in water infiltration rates. Soil compaction reduces the supply of air, water, and nutrients to plants. Roading, ground-based yarding, and dozer piling are the major contributors to compaction.
- Detrimental displacement is the removal of one or more inches (in depth) of any surface soil horizon, usually the A horizon, from a continuous area greater than 100 square feet.
- Rutting consists of wheel ruts at least 2 inches deep in wet soils.
- Surface erosion is indicated by rills, gullies, pedestals, and soil deposition and should be kept within tolerable limits by retaining the enough ground cover, depending onsite characteristics.
- Severe fire consumes most woody debris and the entire duff and litter layer, exposing mineral soil and creates very high temperatures at the soil surface when surface soil moisture content is low. Many of the nutrients stored in these organics can also be volatilized and removed from the site in fly-ash (Garrison and Moore 1998).

### *Loss of Potassium*

Preliminary research by the Intermountain Forest Tree Nutrition Cooperative (IFTNC) shows a possible link between potassium deficiency and the lack of tree resistance to root disease; however, this correlation is an observation and has not been tested. On some sites, 45 percent of the potassium is detained in trees, with the remainder being held in subordinate vegetation, forest floor, and soil pools. Within the trees, about 85 percent of the potassium is held in the branches, twigs, and foliage (Garrison and Moore 1998). Douglas-fir and ponderosa pine are generally intermediate with respect to foliar nutrient content and their resulting effect on a site's nutrient budget (Moore et al. 2004).

In most natural circumstances, the potassium returns to the soil when the tree dies. Unlike many other soil nutrients, potassium is derived primarily from underlying geologic formations and is a product of slow weathering processes. Some geological formations of the metasedimentary Precambrian Belt Supergroup have a natural deficiency of potassium; however, the

predominantly granitic rocks of the area are not expected to be as low in potassium as Belt rocks (Garrison-Johnston 2004).

Whole-tree yarding and removal of treetops can lead to the direct loss of potassium (Morris and Miller 1994). The IFTNC continues to research potassium contents within tree species and different rock types in order to establish specific minimum thresholds for retention and effects of potassium on tree growth and resistance to root diseases (Mika 2005; Shaw 2005). Until these minimum thresholds are developed through research, the Idaho Panhandle National Forest is using the following management recommendations from the IFTNC as a guideline for maintaining sufficient potassium on a site:

A. Practice conventional removal (lop and scatter) rather than whole-tree removal. The "lop and scatter" technique should be practiced during intermediate as well as final harvest operations.

B. Let slash remain on site over winter so mobile nutrients such as potassium can leach from fine materials back to the soil.

C. Use a light broadcast burn or underburn for release of potassium and other nutrients.

D. Avoid mechanical site preparation.

E. Plant species appropriate to the site.

These measures have been incorporated into the design and mitigation measures for soils (see Chapter 2, Features Designed to Protect Soils and Site Productivity).

### *Land Types and Hazard Ratings*

Nine land types have been identified and mapped in the project area. Descriptions of each landtype as well as a map of the landtypes are located in the soils section of the project file. Hazard ratings have also been compiled and are broken into subcategories of mass failure, surface soil, and sediment delivery potential; each is rated as low, moderate, or high for a particular land type (table 3-14).

**Table 3-14. Erosion, mass failure, and sediment delivery hazard ratings by land type.**

| Land Type Map Unit | Mass Failure Potential | Surface Erosion Hazard | Sediment Delivery Potential |
|---|---|---|---|
| 103 | Low | Low | High |
| 109 | Low | Moderate | High |
| 190 | Low | Moderate | Low |
| 350 | Low | Low | Low |
| 351 | Low | Low | Low |
| 360 | Low | Low | Low |
| 361 | Low | Low | Low |
| 370 | Low | Low | Low |
| 371 | Low | Low | Low |

***Mass failure potential*** is the relative probability of downslope movement of masses of soil material. Ratings consider slope, soil depth, soil texture, bedding, density, and water input. All nine soil units exhibit low mass failure potential and therefore will not be further analyzed.

Of the nine land types in the project area, seven were rated as exhibiting low ***surface erosion potential*** and two (Units 109 and 190) were rated as moderate. Unit 109 is described as low to high elevation, poorly drained floodplains, bogs, and wet meadows. This unit is located along the headwaters of Johnson Creek and will not be disturbed by logging activities. Unit 190 is described as mid- to high-elevation rock outcrop and talus with shallow soils. This soil map unit constitutes approximately 85 acres within the project area, out of which 53 acres are proposed to be harvested (3.4 acres skyline, 30.3 acres tractor, and 19.4 tractor/winter). Given the topography of these 53 acres, the lack of existing or planned roads, harvesting during the dry season, and skid trail erosion control measures would result in fairly low surface erosion potential.

The ***Sediment Delivery Potential*** is a rating of the probability of eroded soil reaching a stream channel. By using slope gradient, slope shape, and distance to channel, a rating of low, moderate, or high potential is determined. Of the nine soil units evaluated, seven were rated low, while two (Unit 103 and 109) were rated as having a high potential for delivering sediment to stream channels. Unit 103 has been mapped and defined as mainly narrow valley bottoms consisting of second order and higher perennial streams and riparian zones adjacent to mountain toe-slopes. Unit 109 contains poorly drained floodplains, bogs, and wet meadows with some areas of mixed-coniferous and deciduous forest surrounding these areas. Since stream bottoms and wet meadows will not be entered or logged, potential increases of sediments from these units should be minimal.

## Existing Conditions

### *Soils and Productivity*

The soils found in the Wrenco Loop project area owe their high productivity to nutrients and other favorable characteristics provided by an ash-capped layer that can extend to over two feet deep in certain locations. However, these generally young and poorly developed soils can experience long-term deficiencies when not enough of one or more biologically essential elements remain in the root zone.

The two main components that sustain productivity include organic matter and coarse woody debris (table 3-15). Organic matter content varies throughout the project area and appears to be optimum or high in the northern portion and low to optimum in the central and southern portion. Its depth usually correlates to habitat type and aspect with excessive needle cast often decreasing the establishment of a more herbaceous cover.

Coarse woody debris was found to be variable as well. Some stands contain high amounts of downed wood (i.e. stand 64304050) while others have very little if it would not be for occasional paper birch debris (i.e. stand 64304054). Decomposition may also be reduced because of the reduction of light and moisture penetration through a dense overstory.

### *Detrimental Soil Impacts*

Compaction, displacement, erosion, rutting/puddling, and severe burning are the disturbances that can all be detrimental to various soil functions and processes. As stated previously, proposed harvest activities were evaluated using the spreadsheet model, which identified seven stands for field review that could potentially be impacted above 10 percent. The Forest Soil Scientist visited

all of these stands (and others) and conducted the "Onsite Assessment Method" (Niehoff 2002) in the fall of 2004 which produced results outlined in table 3-16 (field notes are located in the project file – soils section).

**Table 3-15. Organic matter percentages and coarse woody debris (tons/acre) measurements for several stands following guidelines in Niehoff (2002)**

| Organic Matter (%) | | | |
|---|---|---|---|
| Stand | <¾ inch – low | ¾ to 1¾ - optimum | >1¾ - too much |
| 643-04-005 | 0 | 20 | 80 |
| 643-04-044 | 0 | 50 | 50 |
| 643-04-047a | 19 | 52 | 29 |
| 643-04-047b | 40 | 30 | 30 |
| 643-04-050 | 62 | 34 | 4 |
| 643-04-052 | 56 | 26 | 18 |
| 643-04-054 | 28 | 50 | 22 |
| **Coarse Woody Debris (tons/acre)** | | | |
| 643-04-005 | Not measured | | |
| 643-04-044 | 8.5 | | |
| 643-04-047 | 22.1 | | |
| 643-04-050 | 19 | | |
| 643-04-052 | 17 | | |
| 643-04-054 | 11 | | |

Field verification found traces of past activities (see table 3-1 for a list of activities), primarily in the form of stumps, in the moister habitat types between ridges in the northernmost project area. Stumps are also dispersed throughout the more gentle sloping areas in the south, though little evidence of skid trails was found. Sampling of soils around stumps and along possible haul routes showed little to no compaction or disturbance. Only few areas (stands 643-04-047, 643-04-050, 643-04-052, and 643-04-054) were slightly more compacted in localized areas, but most others ranged within the expected natural variation (project file – soils section). The more compacted areas could have been where tractor logging occurred in the 1940s, '50s, and '60s however there are no specific records documenting this. The lack of ruts and skid trails suggests that past logging operations likely occurred during times of dry soil conditions, on snow during the winter, or even with the aid of horses for those earlier undocumented past harvests. Besides several old burned logs and stumps, the area has recovered from any fire-related impacts in the past.

Results show that five of the 17 timber stands would exceed detrimental disturbance limits of 15% if no mitigation measures were incorporated. Since all the measured disturbances are directly related to existing roads or skid trails, it is essential that any ground-based equipment in timber stands 643-04-047, 643-04-050, 643-04-052, and 643-04-054 use existing skid trails and slash mats to reduce additional impacts from the proposed harvest. This should not be difficult since most of the disturbance found is fairly localized, especially in stands 643-04-047 and 643-04-050. These mitigation measures should, therefore, reduce proposed harvest impacts to below the 15% level.

**Table 3-16. Field evaluation monitoring results for existing conditions and potential impacts, following guidelines in Niehoff (2002)**

| Disturbance (%) | | | |
|---|---|---|---|
| **Stand** | **Existing Detrimental Condition (%)** | **Potential Harvest Impacts without Mitigation (%)** | **Proposed Harvest Impacts with Mitigation (%)#** |
| 643-04-005 | 0 | 13 | 13 |
| 643-04-010 | 0 | 7 | 7 |
| 643-04-011 | 0 | 9 | 9 |
| 643-04-013* | 4 | 17 | 13 |
| 643-04-044 | 0 | 13 | 13 |
| 643-04-047** | 8 | 20 | 12 |
| 643-04-049 | 0 | 7 | 7 |
| 643-04-050 | 8 | 21 | 13 |
| 643-04-051 | 0 | 9 | 9 |
| 643-04-052 | 2 | 16 | 14 |
| 643-04-054 | 4 | 17 | 13 |

#For mitigation measures see features designed to protect soil and site productivity – Chapter 2.

*Stand was evaluated on a separate visit (see Dillon, personal communication, February and March 2005)

**Existing detrimental condition percentage is an average of two separate areas (5% and 10%) within the timber stand.

### *Loss of Potassium*

Harvest is a one-point-in-time removal of nutrients that have been accumulated in the wood over a certain amount of time. Of increased concern is the role of potassium in forest health, especially susceptibility to insects and disease (Garrison-Johnston et al. 2001). Current research by the IFTNC and others suggests a complex balance between underlying geology and the natural deficiency of potassium in northern Idaho, mainly due to slow weathering processes. Granitic rocks found in most of the area are not expected to be as potassium deficient as Belt formation metasedimentary rocks (Garrison-Johnston 2004).

Since much (~45%) of the available potassium is detained in trees, primarily in the branches and foliage (~85%), it is imperative to recycle as many nutrients as possible before removal. This can be done by overwintering the small-scale debris to leach out potassium (Baker et al. 1989; Barber and Van Lear 1984; Edmonds 1987; Garrison and Moore, 1998; Laskowski et al. 1995 and Palviainen et al. 2003). Precipitation is also believed to return the removed nutrients within 70 to 100 years (Stark 1979).

## *Environmental Consequences*

### Methodology

Potential effects from proposed logging systems, permanent and temporary roads, landings, and fuels treatments on soils are analyzed to determine whether proposed activities would detrimentally impact or have cumulative effects on soils. The Idaho Panhandle National Forests Soil NEPA Analysis Process (Niehoff 2002) was used as a qualitative assessment tool. For each alternative, the detrimentally disturbed acres were calculated using coefficients based on past

Forest soil monitoring data. This monitoring information is contained in past Forest Plan Monitoring and Evaluation Reports and is summarized in the Idaho Panhandle National Forests Soil NEPA Analysis Process. For direct and indirect effects, the calculations incorporated the acres and types of proposed logging, burning, and the acres of roads and landings constructed. Field visits were undertaken to further validate results and to gather additional information about existing conditions in the project area. All field data collected is located in the soils section of the project file.

**Direct effects** on soils from proposed activities were measured by analyzing the effects of compaction, displacement, rutting, surface erosion, and severe burning on the soil surface. The generally ash-capped surface soil is the most productive and easiest layer to be disturbed through normal land use activities. The extent of impacts depends on the type of logging system and fuel treatments used, and whether there is construction of roads and landings.

Tractor and skyline logging systems are proposed for action alternative A (see table 2-4 in Chapter 2 and associated maps). Roads and landings that remain on the landscape for future use cause irretrievable effects on productivity as those lands become “dedicated” to the permanent transportation system. Those that are temporary (i.e., only needed for the project) and are planned for decommissioning have detrimental effects initially but rehabilitation efforts (subsoiling and/or recontouring) initiate a long-term recovery process.

Based on past monitoring efforts (Niehoff 2002), tractor logging prior to 1990 has had the most detrimental impacts to soils (between 24% and 42%). Since 1990, tractor-logging methods and recommended protection measures have decreased most detrimental impacts to an average of 13 percent (Niehoff 2002), two percent less than the maximum allowable criteria established by regional guidelines. Helicopter and skyline logging systems tend to have between 0 and 3 percent detrimental effects (Niehoff 2002, McIver and Starr 2000, pp. 11-16). These logging systems have less impact than tractor systems because the equipment stays on the road, and the logs are partially suspended over the ground; impacts to soils in skyline logging result largely from the logs being dragged over the ground (Krag 1991, Seyedbagheri 1996 pp.7-9).

Acres of detrimental disturbance (table 3-18) were calculated by multiplying the acres of activity disturbance by the disturbance coefficient derived from monitoring reports. Coefficients used for proposed logging systems are shown in table 3-17.

**Table 3-17. Coefficients used indicating potential detrimental disturbance for various logging and burning scenarios**

| **Tractor Logging** | **Detrimental Disturbance Coefficients (%)** |
|---|---|
| With spring burning or grapple piling | 13 |
| With fall burning | 15 |
| **Skyline Logging** | |
| With spring burning | 0 |
| With fall burning on south/southwest aspects | 2 |

Coefficients for road construction used 35-foot widths, which take into account a 14-foot-wide surface, and cut and fill slope disturbance. The majority of skyline landings are associated with classified roads and are therefore accounted for since these sites are dedicated lands and cause

irretrievable effects. All skyline landings are located on classified roads. All landings associated with tractor yarding are included in the model coefficients.

**Indirect effects** include the loss of site productivity due to removal of large woody debris and potassium. Large woody debris is essential for maintenance of sufficient microorganism populations and serves as a long-term supplier of organic material and nutrients for soils. Research has indicated that potassium is an important element in site productivity so mitigation measures were designed to meet the management of large woody debris and organic matter as detailed in the research guidelines contained in Graham et al. (1994). These recommendations emphasize tons/per acre and include material greater than three inches in diameter. Foliage and branches would be left over the winter to allow potassium to leach out of these materials (Garrison and Moore 1998). See Features Designed to Protect Soils and Site Productivity in Chapter 2 for all soil protection measures proposed.

**Cumulative effects** include the combination of direct and indirect effects with effects of past, present and reasonably foreseeable activities. Since direct and indirect effects from soils are measured within "activity areas," the cumulative effects analysis area for the soils resource consists of those activity areas proposed for soil-disturbing activities within the project area only where previous management activities have occurred. Existing roads and landings designated as "classified" on the National Forest transportation system are considered designated lands.

## Direct and Indirect Effects

### *Effects Common to Both Alternatives*

**Risk of Wildfire** – Records of historic wildfires enforce that the potential for future wildfire remains, especially if a fire ignites in an untreated area under dry weather conditions. Severe deteriorating effects that wildfires have on soils usually include loss of organics and nutrients and a reduction of water infiltration (Wells et al. 1979, p. 26). Burns that create very high soil surface temperatures, particularly when soil moisture content is low, result in an almost complete loss of soil microbial populations, woody debris, and the protective duff and litter layer over mineral soil. Since erosion increases following a fire are often directly proportional to fire intensity (Megahan 1990, p. 146), the removal of ash-capped surface soils could reduce soil productivity.

Many of the nutrients present in surface organics and large woody debris can be lost to the atmosphere through volatilization and removed from the site in fly-ash (DeBano 1991, pp. 152-153; Amaranthus 1989, p. 48). Burn ashes are usually white or reddish in color, indicating that much of the carbon is oxidized by fire.

When soils turn hydrophobic, water infiltration is reduced. Though hydrophobicity is a naturally occurring phenomenon that can be found on the mineral soil surface, it is greatly amplified by increased burn severity (Huffman et al. 2001). The heat of a fire vaporizes hydrophobic compounds in the organic matter and moves them into the soil layer where they condense and form a water repellant coating on the soil particles. Soil hydrophobicity usually returns to pre-burn conditions in no more than six years (DeBano 1981; Dyrness 1976) and other studies have documented a much more rapid recovery of one to three years (Huffman et al. 2001). However, before infiltration improves, increased overland runoff and sediment movement can be expected.

### *Alternative A – Proposed Action*

The effects of the action alternative on the soil resource were assessed based on their potential to create detrimental impacts and to affect soil productivity (see table 2-4 in Chapter 2 and associated maps).

To reduce the impacts to soils and soil productivity, this alternative utilizes Soil and Conservation practices as outlined in the Soil and Water Conservation Practices (SWCP) Handbook FSH 2509.22. This handbook outlines Best Management Practices (BMPs) that protect the soil and water resources at a higher level than do existing Idaho Forest Practices rules and regulations, thereby incorporating all Idaho state standards. Through a memorandum of understanding with the State of Idaho (9/19/88), FSH 2509.22 replaces Forest Plan Appendix S – Best Management Practices. These SWCPs are included as design criteria (Chapter 2/Appendix A) and would be applied during timber harvest and road work.

The techniques and their effectiveness are documented in several publications and Forest Service websites (USDA Forest Service 1999a, http://www.fs.fed.us/r1/lolo/resources-natural/soil-water/best-mgt-practices.html, Seyedbagheri 1996, Lynch and Corbett 1989, 1990, Idaho DEQ 2001, USDA Forest Service 2001). These BMPs (Appendix A) would have a high effectiveness in minimizing soil compaction and displacement, address seeding of disturbed areas, limit operations when soil moistures are high, and address conduct of logging.

Mitigation as specified in Chapter 2, “Features Designed to Protect Soil and Site Productivity” would also be implemented as part of this alternative to ensure that activities are consistent with Forest and Regional guidelines in terms of soil compaction, displacement, and nutrient retention.

**Road Issues** – Although system roads are not considered to be part of the activity area at the Regional level, an analysis of the total impacts of roads to be used to complete the proposed activities was conducted. Effects due to construction and decommissioning of roads are predicted in ten stands (643-04-010, 643-04-011, 643-04-044, 643-04-046, 643-04-047, 643-04-048, 643-04-049, 643-04-052, 643-04-053, and 643-04-054; table 3-18). Alternative A proposes approximately 3.5 miles of road construction that would be used to move personnel, logs, and/or equipment to complete the harvest and fuels treatments (some on already existing roads that would be reconditioned). This would cause long-term soil compaction, displacement, and effects to site productivity on approximately 15 acres (2.5% of total activity area) assuming an average road width of 35 feet. These roads would be put in storage after use for the project until needed for future management. Roads put into storage are considered dedicated lands because they become part of the permanent transportation system.

About 0.8 mile of road (~3.4 acres) would be decommissioned, which includes ripping the road prism on either end of road 1023, restoring stream channel crossings, seeding, fertilizing, and topping the areas with woody debris.

**Table 3-18. Summary of road construction and decommissioning impacts**

| | | Alternative B (No Action) | Alternative A | | | |
|---|---|---|---|---|---|---|
| Unit | Activity Area (acres) | Existing Roads (miles) | Existing Roads to be decom-missioned (miles) | System Road Constr. (miles)* | System Road Constr. (ac)** | Percentage of soils removed from long-term soil productivity in Stand |
| 64304005 | 24 | 0 | 0 | 0 | 0 | 0 |
| 64304008 | 9 | 0 | 0 | 0 | 0 | 0 |
| 64304010 | 187 | 0 | 0 | 1.33 | 5.64 | 3 |
| 64304011 | 58 | 0.64 | 0.20 | 0.44 | 1.87 | 3.2 |
| 64304013† | 7 | 0 | 0 | 0 | 0 | 0 |
| 64304044 | 23 | 0 | 0 | 0.18 | 0.76 | 3.3 |
| 64304045 | 1 | 0 | 0 | 0 | 0 | 0 |
| 64304046 | 16 | 0 | 0 | 0.10 | 0.42 | 2.6 |
| 64304047 | 78 | 0 | 0 | 0.71 | 3.01 | 3.9 |
| 64304048 | 15 | 0 | 0 | 0.02 | 0.08 | 0.5 |
| 64304049 | 68 | 0 | 0 | 0.04 | 0.17 | 0.3 |
| 64304050 | 21 | 0 | 0 | 0 | 0 | 0 |
| 64304051 | 29 | 0 | 0 | 0 | 0 | 0 |
| 64304052 | 36 | 0.29 | 0.29 | 0.23 | 0.98 | 2.7 |
| 64304053 | 0 | 0.36 | 0.33 | 0 | 0 | 0 |
| 64304054 | 36 | 0.12 | 0.02 | 0.48 | 2.04 | 5.6 |
| 64304057 | 3 | 0 | 0 | 0 | 0 | 0 |
| **Totals** | **612** | **1.41** | **.84** | **3.53** | **14.98** | |
| Totals | 612 | Total area of impacts from existing roads = 6 acres<br>Total additional impacts in project area = 0%<br>Tot. mi. of decommissioning = 0 | Total impacts from road construction in project area: 15 acres (2.5%)<br>Total mi. of decommissioning = 0.84 (0.2%) | | | |

*Difference of 3.12 mi vs. 3.3 is due to rounding error and 0.14 mi of Riley Creek access road not accounted for in this column. Also, system road construction may include reconditioned existing road or new road construction.

**Road width is assumed at 35 ft., which takes into account a 14-foot-wide surface, and cut and fill slope disturbance.

**Vegetation Treatments** – A direct effect of management actions would be an increase in detrimental soil disturbances such as compaction and displacement, particularly in stands where multiple activities such as road and landing construction, fuels treatment, and tractor logging are planned. Minor disturbances would occur on skyline units and where fireline is constructed around a perimeter, but past monitoring shows these impacts result in virtually no detrimental impacts (Forest Plan Monitoring and Evaluation Report, USDA Forest Service1991, Niehoff 2002).

Table 3-19 displays activity areas (timber stands) that contain tractor and skyline logging. Fuel treatments are not shown in the table because design features would ensure impacts would be negligible. Effects of fuel treatments are discussed later in this section.

**Table 3-19. Summary of harvest impacts on soil by alternative**

| | | Alternative B (No Action) | | Alternative A | |
|---|---|---|---|---|---|
| Unit | Activity Area (acres) | Existing Detrimental Impacts(%)* | Potential Detrimental Impacts in Activity Area(%) | Potential Detrimental Impacts (acres)** | Potential Detrimental Impacts in Activity Area(%)** |
| 64304005 | 24 | 0 | 0 | 3.1 | 13 |
| 64304008 | 9 | 0 | 0 | 0.7 | 8 |
| 64304010 | 187 | 0 | 0 | 14.0 | 7 |
| 64304011 | 58 | 0 | 0 | 5.3 | 9 |
| 64304013† | 7 | 4 | 0 | 0.9 | 13 |
| 64304044 | 23 | 0 | 0 | 2.4 | 10 |
| 64304045 | 1 | 0 | 0 | 0.08 | 13 |
| 64304046 | 16 | 0 | 0 | 1.4 | 9 |
| 64304047 | 78 | 8 | 0 | 8.6 | 11 |
| 64304048 | 15 | 0 | 0 | 1.56 | 11 |
| 64304049 | 68 | 0 | 0 | 5.6 | 8 |
| 64304050 | 21 | 8 | 0 | 2.7 | 13 |
| 64304051 | 29 | 0 | 0 | 2.7 | 9 |
| 64304052 | 36 | 2 | 0 | 2.88 | 8 |
| 64304053 | 0 | 0 | 0 | 0 | 0 |
| 64304054 | 36 | 4 | 0 | 2.8 | 8 |
| 64304057 | 3 | 0 | 0 | 0 | 0 |
| **Totals** | **612** | | | **54.72** | |

*derived from field assessment

**derived from spreadsheet model

†Stand was evaluated in 2005 (see Dillon, personal communication, 2005)

Alternative A proposes regeneration cutting on 82 acres and selective cutting on 530 acres using tractor skidding and skyline yarding. Fuel treatments are proposed on all 612 acres and consist of 471 acres of grapple piling and 141 acres of underburning (refer to table 2-4 in Chapter 2).

The majority of activities would occur during dry summer months (326 acres) with some areas proposed to be logged during the winter season (285 acres), which would further reduce effects of compaction and displacement.

The spreadsheet model estimates that approximately 55 acres would be detrimentally disturbed throughout the entire project area and therefore removed from a long-term productive growing state due to effects of compaction (table 3-19). This disturbance is predicted to occur primarily in activity areas subjected to tractor logging during non-winter months. This 55-acre disturbance represents 8.9 percent of the total project area. Results of modeling are included in the soils section of the project file.

Given that logging proposed for this project consists mostly of ground-based systems, design and mitigation measures outlined in Chapter 2 under Features Design to Protect Soils and Site

Productivity would be used. Based on monitored existing conditions and estimated potential impacts, Stands 643-04-013, 643-04-047, and 643-04-050 should receive the highest mitigation levels to ensure that proper design features are used to meet required soil quality standards.

All skyline landings would be located on system roads. Where landings are located within a cutting unit, they were considered in the activity area calculations for detrimental impacts. Disturbance on these sites due to compaction, displacement, rutting, and pile burning could have some detrimental effects. Landings located within stands with higher compaction levels (643-04-047, 643-04-050, 643-04-052, and 643-04-054) would be rehabilitated with scarification, seeding, and allowing slash to decompose on site, as described in Chapter 2 under Features Design to Protect Soils and Site Productivity. These measures would help restore soil productivity in the long term.

**Soil Productivity** - Granitic rocks found in most of the area are not expected to be as potassium deficient as Belt formation metasedimentary rocks (Garrison-Johnston 2004). Nevertheless, fine residue (foliage and branches) would be allowed to overwinter on-site to allow potassium and other nutrients to leach out of these materials and back into the soil where they would be available for uptake by other vegetation. Selective tree harvest would reduce competition for soil nutrients resulting in higher nutrient concentrations available for uptake by remaining vegetation.

As a direct effect, harvesting on all sites would remove, within each tree bole, about 14 percent of the potassium that is contained within a tree, which may have an indirect affect on some plants. Douglas-fir and grand-fir consume and store more potassium than most other trees. The release and availability of this stored potassium would benefit larch, ponderosa pine, and Western white pine, which require less potassium for growth and maintenance (Garrison and Moore 1998). These more potassium-efficient trees would be planted in all regeneration harvest units and retained within the selective cutting units. Measuring the effects on site productivity cannot be done with certainty until more research information becomes available. Meanwhile, management recommendations from the IFTNC are used as a guideline for maintaining sufficient potassium on a site.

Approximately 7 to 14 tons per acre of coarse woody debris (slash) would be left on Douglas-fir/grand fir sites and 17 to 33 tons/acre on hemlock/cedar sites for coarse woody debris recruitment. This would provide protection against soil erosion as well as a long-term source of nutrients and organic matter (Graham et al. 1994). However, removal of excess woody debris reduces the potential for high-temperature uncontrolled fires that could otherwise sterilize the soil at high temperatures, cause highly erosive hydrophobic soil conditions, and reduce overall soil productivity (Pritchett and Fisher 1987).

**Prescribed Burning and Slash Disposal** - Alternative A proposes 141 acres of underburning and 471 acres of grapple piling and burning to be conducted using BMPs to minimize the potential of overheating the soil (see Chapter 2). No tops would be yarded. No measurable negative soil effects are anticipated from post-harvest burning if soil moisture for prescribed burning is ≥25%. This is especially crucial for south-facing slopes in the fall. Following these requirements will limit the potential to create hydrophobic conditions or to induce significant nutrient losses.

Direct effects of prescribed underburning and pile burning could potentially remove woody debris that would otherwise provide nutrients to the soil as the decay process occurs. To minimize potential nutrient concentration in piled areas, slash would be allowed to remain on site over the winter prior to piling to allow nutrient leaching to take place. In addition, burning during high soil moisture would help maintain coarse woody debris requirements.

### *Alternative B - No Action*

Under this alternative, no new management-induced detrimental impacts would occur in the Wrenco Loop area. Stands currently at high risk for mortality would not be treated, which may increase the risk of stand loss due to wildfire (see above), severe burning, and loss of soil nutrients. Moreover, the introduction of weeds and unwanted flora following a fire could lead to higher competition between less desirable and native vegetation. In the absence of such a hot fire, nutrients would be retained on site. However, stand conversion back to more site-appropriate tree species would be delayed relative to the action alternative A.

No direct effects to soils would occur in Alternative B as no road construction, logging, or fuels treatment would occur. There would be no compaction or displacement beyond existing levels. On existing roads, no change in use or management would occur in the foreseeable future.

## Cumulative Effects

### *Past, Present, and Reasonably Foreseeable Activities*

**Timber Harvest -** The project area has been influenced by past harvest activities and could be affected by present and future land management (see table 3-1). Despite previous logging that took place between the 1940s and 1960s, little soil disturbance was found throughout the project area. There are no ongoing or reasonably foreseeable timber harvest activities on National Forest lands beyond what is currently proposed in this project.

**Roads -** Roads constructed in the past provide access to Federal and private land in the Wrenco Loop area. System roads were removed from productivity when they were constructed and have little to no additional effect on the area if they are properly maintained. Road 1023A is a thoroughfare to private land and could see an increase in private timber hauling in the future. There is no other ongoing or reasonably foreseeable road construction proposed in the project area.

**Recreation -** The project area has been open for recreational use in the past but has been closed to general motorized use to the public. Most individuals enter on foot to hunt or hike in the area. Illegal motor vehicle use occurs, but is infrequent. With the implementation of this project, the area would be managed to prohibit any type of motorized vehicle use on all National Forest roads with a road closure.

**Wildfire and Prescribed Burns -** Wildfires have been common in the past with the fire of 1926 being the most recent, large-scale, stand-replacing event. Fire should not be eliminated as an ecological process and proper management through fuel reduction and prescribed burning should sustain an environment were fire is integrated and soil damage is minimal. Successful fire suppression activities would eliminate the chance of detrimental effects to soil productivity. There would be minor amounts of soil disturbance from fireline construction and other firefighting methods.

### *Alternative A – Proposed Action*

Cumulative detrimental impacts from proposed activities in addition to past activities are possible in five stands (643-04-013, 643-04-047, 643-04-050, 643-04-052, and 643-04-054). The spreadsheet model predicts cumulative effects of 11% to 13% detrimental impacts on 17 acres (2.7% of the project area) in five stands and 7% to 10% detrimental impacts on 39 acres (6.3% of the project area) in 12 stands with proposed ground-based harvest and fuel treatment activities. Detrimental impacts in stands would be localized on new skid trails or existing trails that will be

incorporated into the proposed harvest design. Therefore, the cumulative detrimental soil impacts due to proposed activities in stands with previous activities are expected to remain below the Regional standard of 15% since standard design criteria and best management practices are to be implemented.

Since there would be no measurable negative soil effects anticipated from post-harvest burning, there would be no cumulative effects on soils. Road construction would take 15 acres (2.5%) of soils out of productivity since these areas would become dedicated lands for future use. Ground-disturbing activities would also occur on 0.8 mile of road (~3.4 acres) due to decommissioning. However, the long-term benefits of returning these areas to a productive state, decreasing surface erosion, and restoring hydrologic processes far outweigh the potential short-term impacts of road decommissioning activities.

The proposed vegetation and fuel treatment activities in Alternative A are expected to remove site nutrients with the removal of tree boles. Certain nutrients, particularly potassium, are known to be critical for tree resistance to insects and disease, especially root-rotting organisms (Garrison and Moore 1998). However, nutrient management guidelines including maintenance of coarse woody debris (Graham 1994) and overwintering of logging slash (Garrison and Moore 1998) would maintain as much nutrient capital on site as possible. Past logging likely removed some nutrients from the proposed treatment areas. However, given the limited amount of harvest and methods of the time that left limbs and tops on site, loss of nutrients from these activities is not considered substantial enough to have cumulative effects with the proposed action.

Combining the predicted detrimental impacts of proposed activities and the total area of existing system roads to be used for project implementation, cumulative detrimental impacts may total up to 11% (70 acres) in the project activity area (612 acres). No additional impacts to soil would occur from proposed road maintenance activities, which consist of blading, drainage improvement, and surfacing.

Since recreation activities are limited in the area, they are not anticipated to have cumulative effects with proposed activities.

### *Alternative B - No Action*

Detrimental impacts from past activities would remain in five stands (643-04-013, 643-04-047, 643-04-050, 643-04-052, and 643-04-054; see table 3-19), but because there would be no proposed activities, there would be no cumulative effects.

Diseased trees would remain and affected areas would spread and increase in size and concentration. The additional debris would add to the threat of wildfire by enhancing the fuel load and could prolong and intensify damaging effects to the soil resource.

## Consistency with the Forest Plan and Other Regulatory Direction

The action alternative would comply with Forest Plan Standards and the Regional Soil Quality Standards (FSM R1 Supplement 2500-99-1) related to detrimentally disturbed soils

### *IPNF Forest Plan Standards*

Soil disturbing management practices, including system roads, would comply with the Forest Plan Standard requiring >80% of an activity area to remain at an acceptable productivity potential (see Soils section of project file).

The Regional guidance to follow the coarse woody debris recommendations of Graham et al. (1994) would adhere to the Forest Plan Standard to maintain sufficient microorganism populations to maintain long-term site productivity.

IFTNC nutrient management recommendations would ensure compliance with the Forest Plan Standard to maintain of sufficient nutrient capital.

Management area direction to implement Best Management Practices would be included in the proposed action.

### *Regional Manual Recommendations*

Detrimental disturbance would not exceed the recommended 15% in any individual activity area.

Fine organic matter layer thickness would be retained as appropriate for local conditions.

Large woody debris would be maintained at recommended volumes (Graham 1994) in each proposed activity area.

# Aquatic Resources

## *Regulatory Framework*

Under authority of the Clean Water Act, the Environmental Protection Agency (EPA) and the State of Idaho must develop plans and objectives that will eventually restore identified stream segments of concern. Johnson Creek is not considered impaired and is currently meeting beneficial uses, under the State of Idaho's 303d process (IDEQ 2002).

The Idaho Department of Environmental Quality (IDEQ) designates beneficial uses to be protected for each water body in the state. Idaho Water Quality Standards describe beneficial uses for certain streams in Idaho. For non-designated streams in Idaho, of which Johnson Creek is one, beneficial uses are determined by the existing and presumed uses in accordance with Section 100:

- For **aquatic life**, cold water (COLD): water quality appropriate for the protection and maintenance of a viable aquatic life community for cold water species; and salmonid spawning: waters which provide or could provide a habitat for active self-propagating populations of salmonid fishes.
- For **recreation**, secondary recreation (SCR): water quality appropriate for recreational uses on or about the water and which are not included in the primary contact category. These activities may include fishing, boating, wading, infrequent swimming, and other activities where ingestion of raw water is not likely to occur.
- For **water supply**, domestic: water quality appropriate for drinking water supplies; agricultural: water quality appropriate for the irrigation of crops or as drinking water for livestock; and industrial: water quality appropriate for industrial water supplies. (The last two uses apply to all surface waters of the state).
- For **wildlife habitats**, water quality appropriate for wildlife habitats (applies to all surface waters of the state).
- For **aesthetics**, this use applies to all surface waters of the state.

The National Forest Management Act (NFMA) (1976) requires that the Forest Service manage for diversity of fish habitat to support viable fish populations (36 CFR 219.19). Regulations further state that the effects on these species and the reason for their choice as management indicator species (MIS) be documented (36 CFR 219.19 (a) (1)). MIS to consider under the Forest Plan include all threatened, endangered, or sensitive species, species commonly hunted, fished or trapped and any other species whose population changes are believed to indicate effects of management activities on other species of a major terrestrial or aquatic community (USDA Forest Service 1987). Aquatic MIS on the Idaho Panhandle National Forests are cutthroat trout, rainbow trout, and bull trout. Additional direction as it relates to aquatic species is also included in the Forest Plan (USDA Forest Service 1987). The Inland Native Fish Strategy (INFS) (USDA Forest Service 1995a) amended some Forest Plan direction regarding stream and fish habitat protection measures.

Section 7 of the 1973 Endangered Species Act (ESA) includes direction that Federal agencies, in consultation with the US Fish and Wildlife Service (USFWS) via a biological assessment (BA), will not authorize, fund or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of their critical habitat.

Forest Service Manual 2672.41 and 2672.42 (USDA Forest Service 1991) provides direction to prepare a biological evaluation (BE) on Forest Service activities planned, funded, executed or permitted programs that may affect any proposed, endangered, threatened or sensitive (PETS) species. The BE provides review of Forest Service activities in sufficient detail to determine how the proposed action will affect PETS species. Typically, the findings of the BE are documented in the decision notice. Where decision notices are not prepared, the findings are documented in Forest Service files.

The BE may be used or modified to satisfy USFWS Section 7 consultation requirements for a BA in the event there are impacts to threatened or endangered plants or animals.

Other rules and regulations pertaining to aquatic resources include the following:

- Forest Service Handbook 2509.22 Soil and Water Conservation Handbook
- Forest Service Manual 2500 Watershed and Air Management R-1
- Rules Pertaining to the Idaho Forest Practices Act

## *Methodology*

### Analysis Area

The analysis area for direct and indirect effects is the project area. This includes private land in the south half of Section 31 where FS Road 1023 would be upgraded. Streams affected by this analysis are the upper portions of Johnson Creek and the West Fork of Johnson Creek (figure 3-9, map packet).

The cumulative effects area (figure 3-9, map packet) includes the entire drainages of Johnson Creek and the West Fork Johnson Creek to their confluence with the Pend Oreille River. The proposed treatment area of the Wrenco project area encompasses 612 acres of forest, almost 10 percent of the area of the two basins. The cumulative effects area does not extend beyond the confluence with the Pend Oreille River because the Johnson Creek drainage is only about 0.05 percent of the Pend Oreille River basin area upstream of the confluence. To evaluate cumulative

effects on the Pend Oreille River, it would be necessary to investigate all activities in an almost 24,000 square mile basin.

### Analysis Issues

The critical management issues for water quality pertain to above natural increases in sediment and its effects on fish populations and/or habitat within the project area or downstream. Therefore, the analysis of aquatic resources will address effects to hydrologic function, soil erosion, stream crossings, water yield, and fisheries.

#### *Water Yield*

Forest canopy cover moderates precipitation runoff by intercepting and evaporating water. Reduction in canopy cover can increase water yield and increase peak stream flows, particularly in areas subject to rain-on-snow events (areas typically over 4,000 feet). In addition, harvesting methods and new roads can increase soil compaction and increase water yield. A direct evaluation of changes in water yield would require stream flow, gauging records collected over a long enough period to reduce the effects of natural variation. Because such records are not available for Johnson Creek or its tributaries, the only readily available method of estimating changes in water yield is through the Watershed Erosion Prediction Project (WEPP) model described in the next section. This model estimates the average annual runoff, which is an appropriate indicator of the change in water yield. A discussion of the likely effects of the proposed action and mitigating circumstances is presented in the effects analysis.

#### *Water Quality*

The primary water quality issue associated with the proposed action is the potential change in sediment yield. Forested watersheds generally have very low erosion rates unless they are disturbed (Elliott et al. 2000). Road development can lead to increased soil erosion through increase of bare soil surfaces, increased runoff from compacted surfaces, and concentration of flows. Roads also can increase soil loss through mass wasting of failed fill slopes, potentially caused by culvert plugging or concentration of flows, and exposure of soils at stream crossings. Conversely, such activities as improved maintenance procedures, road storage, replacement of bridges or culverts, removal of at risk crossings and stabilization of fill slopes can significantly reduce soil loss.

### WEPP Model

To estimate soil erosion and sediment delivery to streams, the WEPP model was employed in the project area. WEPP is a physically based soil erosion model that considers site-specific information on soil texture, climate, ground cover, and topographic settings (Elliott et al. 2000).

Two components of the model were used to determine the total sediment yield and delivery in the project area. The Disturbed Module estimates the effects of treatment modifications on hillslopes. The Road Module determines effects of road construction or modifications. An important feature of the model is its ability to predict the amount of sediment delivered to a stream by accounting for the sediment transport distance and gradient. WEPP was used to estimate average annual erosion and sediment yield (in tons per year) for each land management unit comparing baseline conditions and the proposed vegetation treatment.

**Hillslopes** - The Disturbed WEPP module was used to predict sediment yield and delivery from hillslopes in the project area. The project area was subdivided into 15 model elements according to proposed vegetation treatment and fuels reduction methods, harvest methods, and topographic

divides (table 3-21). Model elements were further divided into an upper and lower hillslope area, each with its own vegetation type, slope, and canopy cover. The Disturbed module is limited to generalized vegetation cover and exhibits a plus or minus 50 percent accuracy (Elliott et al. 2000). Modeling parameters, assumptions and coefficients are discussed in detail within the aquatics section of the project file.

**Roads** - Water yield, erosion and sediment yield of roads were modeled using the WEPP Roads module (Elliot et al. 1999). This model uses road material, gradient, width, drainage method, fill slope characteristics, and buffer zone characteristics to calculate yields. Each road is divided into segments, which represent lengths between cross-drains. Modeling parameters, assumptions and coefficients are discussed in detail within the Aquatics project file.

The private roads in the south half of Section 31 and the west portion of Section 30 were not included in the model because prescriptions for maintenance in these areas have not been determined, due to right-of-way agreements. At a minimum, some level of road reconstruction that includes shaping, grading and cleaning culverts will be done to these roads. These improvements will reduce erosion and sedimentation generated from these two sections of roads. The effectiveness of these improvements is discussed in Chapter II, Design Criteria for sediment reduction from roads.

### Sediment Risk Associated with Drainage Structures

Road drainage structures (e.g. culverts) at stream crossings are commonly sites of ongoing or potential erosion and sediment sources. Failures occur when debris flows plug culverts and either concentrate water over the tops of road fills or divert water down the road or ditch and onto hillslopes unaccustomed to concentrated overland flow. Both scenarios produce large concentrations of sediment, which can scour the receiving channel bed and banks adding to the total sediment delivery (USDA Forest Service 1998b). This detrimentally affects water quality and habitat for aquatic organisms.

Road drainage crossings were inventoried to assess erosion hazards and risks to aquatic ecosystems, using the *Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings* (Flanagan et al 1998). Crossings were analyzed by collecting site-specific data organized into four categories:

- **Culvert Hazard -** the likelihood of culvert capacity being exceeded and potentially failing;
- **Fill Hazard** – the likelihood of the stream crossing fill failing;
- **Consequence**s – the erosion effects of culvert failure, and;
- **Impacts** – the effects of culvert failure on downstream resources.

Factors in each category were given scores that were then weighted based on importance. The sums of the weighted scores are located in the aquatics section of the project file. Using the Environmental Risk Score and professional judgment, stream-crossing sites were then identified as high, medium, and low priority sites.

## *Fish Habitat and Populations*

The analysis of fish habitat and populations includes the status of current regulatory issues, habitat requirements for particular species, and potential effects of the proposed action on the aquatic environment. Existing condition information was derived from a variety of reports, existing NEPA documents, historical records, aerial photographs, published scientific literature, memoranda, field reviews and other sources such as personal communication with technical

resource specialists on the Idaho Panhandle National Forests. Other information included electrofishing data from West Fork Johnson Creek and data on stream channel types, cross-sectional profiles, woody debris composition and stream temperatures from hydrology surveys on Johnson Creek and West Fork Johnson Creek. Hydrological stream surveys were conducted in 2002 and electrofishing surverys were conducted in 1998 and 2002. (project file –aquatics). Since that time, no disturbance of consequence, such as flood, debris torrent or stand-replacing fire, has affected the streams within the project area.

## *Affected Environment*

The resource information provided in this affected environment section includes descriptions of the fisheries, the channel morphology, and fish habitat in the project area. The effects of past actions (listed in table 3-1) on the existing condition of the aquatic resources are discussed in the cumulative effects analysis.

### Fisheries

Five special status fish species are found on the Idaho Panhandle National Forests and are identified as follows: Kootenai River white sturgeon (endangered); bull trout (threatened); westslope cutthroat trout, interior redband trout and burbot (Forest Service Region One sensitive species). In addition, bull trout, rainbow trout and cutthroat trout are designated as Forest Service management indicator species (MIS).

There is no suitable habitat for Kootenai River white sturgeon or burbot in the analysis area. Interior redband trout currently only inhabit isolated streams in the northern Selkirk Mountains, which is outside the area affected by the proposed action. Therefore, these species will not be analyzed further.

Westslope cutthroat trout have been positively identified in the analysis area. Rainbow trout have been identified in West Fork Johnson Creek slightly downstream from the analysis area. Anecdotal evidence (project file – aquatics) suggests that historically bull trout may have been present in the vicinity of the analysis area. However, Johnson Creek and its tributaries are not included in the recently finalized designated critical habitat for bull trout established by the U.S. Fish and Wildlife Service.

Table 3-20 identifies native and non-native fish species within and in the vicinity of the analysis area as well as their distribution and special species or other statuses. It is unknown to what extent cutthroat and rainbow trout from the Pend Oreille River use Johnson Creek or West Fork Johnson Creek for spawning or rearing, if at all. Forest Service data from 2002 indicate that a large culvert is likely acting as a fish passage barrier on West Fork Johnson Creek near the intersection of Helen Thompson Road and Road 1023, outside the analysis area. However, westslope cutthroat trout were found above and below the culvert (project file – aquatics).

**Table 3-20. Fish Species found in streams in the vicinity of the Wrenco Loop project area[1]**

| Common Name | Scientific Name | Location Where Fish Species are Found | Status |
|---|---|---|---|
| Rainbow Trout | *Oncorhynchus mykiss* | West Fork Johnson Creek outside analysis area | IPNF (MIS species) |
| Westslope Cutthroat Trout | *Oncorhynchus clarki lewisi* | West Fork Johnson Creek within and outside analysis area | Forest Service Region 1 (Sensitive); IPNF (MIS species); State of Idaho (Species of Special Concern); USFWS (Species of Concern) |
| Eastern Brook Trout | *Salvelinus fontinalus* | West Fork Johnson Creek within and outside analysis area | N/A |
| Unknown salmonid species[2] | N/A | West Fork Johnson Creek within and outside analysis area | N/A |

1 Data from Forest Service 1998 and 2002 field sampling (project file - aquatics)

2 2002 Forest Service data reported collection of four unknown salmonid specimens in the 30-59mm length

### *Threatened, Endangered, Candidate, Proposed, Sensitive, and Management Indicator Fish Species*

As indicated in the previous section, only those species present or in close proximity of the analysis area or with the potential to be present in the analysis area are further discussed.

### Bull Trout (Threatened)

Historical records indicate that bull trout may have inhabited at least the lower portions of the Johnson Creek drainage (project file - aquatics). A local resident reported catching several small bull trout in a beaver pond outside of the project area in 1992/1993. This individual indicated that brook trout dominate the system and that no bull trout have been caught since. These fish may have been misidentified or may have been the last remnants of a historic bull trout population having been out-competed by brook trout. There have been no other documented occurrences of bull trout within the Johnson Creek drainage within the past twenty years.

A review of survey records, habitat evaluations and electrofishing surveys indicates that there is a very low potential for bull trout to currently occupy the Johnson Creek drainage for two key reasons: 1) the presence of non-native species (brook trout) which compete for available habitat and interbreed with bull trout; and 2) habitat degradation, such as sedimentation and migration barriers, that have been caused by road building on private and National Forest lands, along with development and logging on private lands, particularly in the lower portion of the drainage outside the project area.

Johnson Creek and its tributaries were not included in the recently finalized designated critical habitat for bull trout established by the U.S. Fish and Wildlife Service. In addition, the Johnson Creek watershed was listed as a low priority for restoration by the Lake Pend Oreille Key Watershed Problem Assessment (Technical Advisory Team 1998) because of the absence of records indicating historic or current use of the system by bull trout and the presence of migration barriers in the lower portion of the drainage from road and railroad crossings. Therefore, the

absence of bull trout in the Johnson Creek drainage and the unlikelihood of their ability to enter and utilize the drainage lead to a no effect on bull trout from the proposed action. As a result, bull trout will not be analyzed further.

### Westslope Cutthroat Trout (Forest Service Region 1 Sensitive, IPNF MIS)

Westslope cutthroat trout is a sub-species of cutthroat trout native to Montana. Its natural range is on both sides of the Continental Divide; excluding the Yellowstone River drainage. It can be difficult to visually distinguish westslope from other cutthroat trout sub-species and the only way to be certain is by genetic testing.

Westslope cutthroat trout were first described by Lewis and Clark and were once extremely abundant. Various studies have estimated that the westslope cutthroat trout now only occupies between 19 and 27 percent of its historical range in Montana and about 36 percent of its historical range in Idaho (Van Eimeren 1996). The most recent status review completed by Shepard et al. (2003) states that throughout their historical range westslope cutthroat trout are now estimated to inhabit 59 percent of the 56,500 miles of stream they historically occupied. However, only six percent of the miles that were historically occupied are currently occupied by genetically pure westslope cutthroat trout (Shepard et al. 2003).

Westslope cutthroat trout have been included in various “watch lists” of agencies and conservation groups since 1966. Currently, westslope cutthroat trout are listed by Region 1 of the Forest Service as sensitive. The USFWS had been petitioned to include the westslope cutthroat trout under protection of the Endangered Species Act. In 2000, they determined that listing was not warranted, due to the species wide distribution, available habitat in public lands and conservation efforts underway by state and federal agencies.

During electrofishing surveys, 52 westslope cutthroat trout were captured in 1998 and 2 were captured in 2002. However, because both were presence/absence surveys, so no population densities or trends could be determined. There was also an increase in the presence of Eastern brook trout between the two sample periods. It can be assumed that densities of cutthroat trout are likely low and the population of cutthroat trout is not large in West Fork Johnson Creek. Also, those fish found in the analysis area may be isolated populations from lower portions of West Fork Johnson Creek due to a culvert causing a fish passage barrier.

### Rainbow Trout (Management Indicator Species)

The native range of rainbow trout (*Oncorhyncus mykiss*) is the drainages of the United States Pacific coast from Alaska to Mexico, the waters of the Pacific Ocean, and the eastern coast of Asia.

Different populations of rainbow trout may have very different life history patterns. Rainbow trout may live in lakes or ponds, they may be stream dwellers or they may be anadromous, spending part of their lives at sea before returning to freshwater to reproduce. They prefer water temperatures of 12 °C to 18 °C and do well in clear, cool, deep lakes or cool, clear, moderately flowing streams with abundant cover and deep pools. They spawn in the spring in small tributaries of rivers, or in inlets or outlets of lakes. Spawning can also take place in late fall or early winter. Rainbow trout usually return to the streams where they hatched. Spawning occurs in shallow riffles with gravel bottoms. Young rainbow trout seek cover and prefer slow-moving shallow stream areas where rubble, rocks, instream debris, and undercut banks provide shelter. Older trout move into faster and deeper stream waters.

Of the 104 fish electrofished by Forest Service in 1998 and 2002, only two were rainbow trout. These fish were collected below the metal culvert on West Fork Johnson Creek near the intersection of Road 1023 and Helen Thompson Road (figure 3-9, map packet).

## Area Hydrology and Fish Habitat

Two streams, including Johnson Creek and its West Fork, drain southeast from the project area and consist of steep to low gradient channels. Both streams empty into the same slough of the Pend Oreille River (figure 3-9, map packet). Migration barriers are present close to the confluence of the slough and the Pend Oreille River due to highway and railroad crossings.

### *Johnson Creek*

An adjacent landowner in the southwest ¼ of Section 29 removes water from Johnson Creek for domestic use (Gadsby water intake, figure 3-9, map packet). No data are available for stream reaches crossing private land. To date, the State of Idaho has not conducted any evaluations to designate the beneficial use(s) for the Johnson Creek drainage (IDEQ 2002). For streams in Idaho without beneficial use designations, the existing and presumed uses become the default beneficial uses. Therefore, cold water biota, secondary recreation, domestic water supply, wildlife habitats and aesthetics are considered the beneficial uses for Johnson Creek. In general, it appears that these beneficial uses are being supported in Johnson Creek with the exception of cold water biota, which is not likely being fully supported due to the existence of manmade migration barriers in the lower portions of the creek and the existence of sediment sources as a result of road building and private development.

#### Channel Morphology

Johnson Creek appears to emanate from a big game wallow in the southeast ¼ of Section 19 and flows southeast. Channel gradient within the project area is typically 4 to 6 percent but occasionally exhibits a gradient of approximately 2 percent with a maximum of 23 percent. A single cross-section was surveyed along this stream reach with the stream type at that cross-section classified as a Rosgen type “G” (project file - aquatics). Type “G” channels are narrow valleys with unstable high bank erosion rates (Rosgen 1996). Channel slope, width to depth ratios, and sinuosity ratios however, are more indicative of a type “B” channel, which exhibit stable banks due to gentle gradients and structurally controlled sideslopes. Median particle size at the surveyed cross-section was a silty sand (project file – aquatics).

#### Fish Habitat

A qualitative stream survey on about 1,480 meters of Johnson Creek was performed in the fall of 2002. This survey discussed canopy cover in the overstory and the understory and showed ranges of 50-100% and 60-85%, respectively. Vegetation in the overstory contained western red cedar, western larch, and paper birch. Vegetation in the understory consisted of western goldthread, false Solomon’s seal, wild ginger and Devil’s club. The data indicated large amounts of woody debris of various size classes with in the stream channel. The majority of the stream consisted of low and high gradient riffles separated by small shallow pool complexes. There was limited water, with the majority of that found in pools, a beaver complex near the headwaters and standing water in the floodplain near the bottom (project file – aquatics).

### *West Fork Johnson Creek*

On private land, the channel meanders through a marshy area where a landowner removes water for domestic use (Kernodle water intake, figure 3-9, map packet). As stated previously, no data

are available for stream reaches crossing private land. As in the case of Johnson Creek, the State of Idaho has not conducted any beneficial use evaluations for the West Fork Johnson Creek drainage (IDEQ 2002). Based on the default beneficial uses described above, cold water biota, secondary recreation, domestic water supply, wildlife habitats and aesthetics are considered the beneficial uses for the West Fork Johnson Creek. Again, in general, it appears that these beneficial uses are being supported in the West Fork Johnson Creek with the exception of cold water biota, which is not likely being fully supported due to the existence of manmade migration barriers in the lower portions of the creek and the existence of sediment sources as a result of road building and private development.

### Channel Morphology

West Fork Johnson Creek begins from a pond in the northwest ¼ of Section 30 and flows to the south-southeast. Channel gradient is typically seven to 12 percent but occasionally approaches two or three percent. Median particle size is typically sand (project file - aquatics). The channel is primarily a Rosgen stream type "B" with a short reach of stream type "DA". Stream type "B" indicates a moderately entrenched riffle pool pattern and stable banks, while type "DA" indicates a multi-channel stream with very stable banks (Rosgen 1996). Stream type "DA" naturally has a high sediment wash load potential (Rosgen 1996). Type DA streams retain stable banks despite high sediment wash load potential due to cohesive fine grained material and dense-rooted vegetation. Stream type "B" continues downstream to where the channel enters private land (SW ¼ of Section 32).

### Fish Habitat

A qualitative stream survey on approximately 3,150 meters of West Fork Johnson Creek was performed by Forest Service personnel in the fall of 2002. This survey was broken down into five different reaches ranging in length from 240 meters to 1,740 meters. Similar to the survey on Johnson Creek, this survey discussed canopy cover in the overstory and showed ranges of 60-90% across all reaches. Limited cover information was available regarding the understory. Vegetation in the overstory contained willow, alder, cottonwood, ponderosa pine, hemlock, western red cedar, western larch, and paper birch. Vegetation in the understory consisted of western goldthread, common snowberry, twisted-stalk, false Solomon's seal, wild ginger, and Devil's club. These data also indicated large amounts of woody debris of various size classes within the stream channel. The majority of the stream consisted of low and high gradient riffles separated by a variety of small shallow pool complexes (project file – aquatics).

### Roads

Approximately five miles of roads currently exist within the project area. Most of the existing haul routes in the area are on weathered granite and appear in stable soil condition with the exception of a few wet areas (Niehoff 1996). Due to the lack of ruts on existing road surfaces, it is believed that past Riley Creek Lumber Company logging operations occurred during times of dry soil conditions.

## *Water Yield Modeled for the Project Area*

Water yield due to runoff from the project area is currently quite low because of the lack of disturbed areas other than roads. Results of the WEPP Disturbed model calculations for the existing condition are presented in table 3-21, and results from the WEPP Road model are in table 3-22. Estimates of water yield from the WEPP Disturbed model indicate only 0.02 acre-feet of runoff in an average year, and results from the WEPP Road model indicate an additional 0.63 acre-feet of runoff in an average year. The only vegetation treatment element that delivers

surface water runoff to a stream under average conditions is element 9, which has been modeled as “five-year old forest” because of the sparse tree cover in this rocky area. The majority of runoff from existing roads occurs at stream crossings, particularly at the ford on FS Road 1023 right-of-way at the West Fork of Johnson Creek in Section 31.

**Table 3-21. WEPP Disturbed Model results - hillslope model for existing conditions**

| Element No. | Treatment Area (Acres) | Treatment | Runoff (ac-ft) | Erosion Rate (t/ac) | Sediment Yield (tons/ac) | Sediment Yield (tons) | Probability of Sediment Delivery in 1st Year % |
|---|---|---|---|---|---|---|---|
| 1 | 63.8 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 2 | 7.1 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 3 | 18.0 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 5 | 38.1 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 6 | 37.9 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 7 | 12.7 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 8 | 5.3 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 9 | 19.4 | 5 yr. Forest | 0.02 | 0.00 | 0.00 | 0.00 | 7 |
| 10 | 112.5 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 11 | 60.0 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 12 | 32.8 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 13 | 23.6 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 14 | 51.6 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| 15 | 120.0 | 20 yr. Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| **Totals** | **602.8** | | **0.02** | | | **0.00** | |

**Table 3-22. WEPP Road Model results – road model for existing conditions**

| Road No. | Length (mi) | Runoff (ac-ft) | Road Prism Erosion (tons) | Sediment Yield (tons) |
|---|---|---|---|---|
| 1023 (private) | 0.65 | 0.46 | 3.32 | 1.63 |
| 1023 (USFS) | 0.64 | 0.09 | 6.45 | 0.38 |
| 1023A | 0.1 | 0.00 | 0.08 | 0.00 |
| 1023 (active portions) | 0.4 | 0.08 | 4.85 | 0.37 |
| Totals | 1.79 | 0.63 | 14.70 | 2.38 |

### *Water Quality Modeled for the Project Area*

Sediment delivery from the project site for the existing condition was estimated using the WEPP Disturbed module and WEPP Road module. Results of the Disturbed model calculations for the existing condition are presented in table 3-21. On the average, no delivered sediment is estimated from hillslopes to streams under existing conditions. The only model element that could deliver

sediment under any condition is element 9, which has been modeled as “five-year old forest” because of the sparse tree cover in this rocky area. This element has a seven percent chance of delivering sediment to a stream in the first year.

Results of the Road model calculations for the existing condition are presented in table 3-22. The primary sources of sediment yield are the ford on FS Road 1023 right-of-way at the West Fork of Johnson Creek in Section 31, the bridge on the West Fork of Johnson Creek, and other stream crossings. The average sediment yield from existing roads is estimated at 2.38 tons per year.

Two crossings are ranked moderately high for risk to failure along the brushed in portion of Forest road 1023. The high risk of failure is due to the potential for stream channel diversion, lack of maintenance, and large throughfill volumes. At a minimum, it would be these two crossings that would be high priority for treatment. The net associated risk of sediment delivery associated with the two crossings is 170 tons. This value is the estimated amount of sediment that would be contributed to Johnson Creek if these culverts were to fail. It is not assumed that the culverts would fail all at once.

## *Environmental Consequences*

### Direct and Indirect Effects

#### *Alternative A – Proposed Action*

**Water Yield -** In general, water yield can be affected by modifications of forest canopy cover. Forest canopy moderates precipitation and resulting runoff by intercepting and evaporating water. In general, removal of forest canopy can increase water yield and increase peak flows, particularly in areas subject to rain-on-snow events (areas above 4,000 feet). New road construction can also increase runoff and peak flows through increasing impervious areas. However, the degree of change in runoff depends on the type and extent of modification implemented under the proposed action.

Water yield and peak flow increases associated with the Wrenco project are predicted to be immeasurable based on the proposed harvesting prescriptions; modeled WEPP results; the estimated average annual runoff yield increase compared to the overall yield within the watershed; and the overall low percentage of treatment within the Johnson Creek watershed.

The proposed treatments consist of thinnings from below, which leaves the majority of the overstory trees, canopy cover and dominant basal area. Area I would see overstory retention of 40 to 65 percent and Area II would retain an overstory of 50 to 70 percent. The regeneration harvest treatments within Area III would leave approximately 25% canopy. However, the overstory trees within this treatment area are already dying due to root disease, which would remove the overstory cover eventually. Compared with the existing forest canopy cover of 30 to 76 percent, the proposed action does not greatly alter the open mosaic structure of forest canopy in this area. This open mosaic forest lies below the elevation of intense rain-on-snow events (typically over 4,000 ft) and is not subject to the high peak flow events of that regime.

Average annual water yield for the project site for the proposed alternative was estimated using the WEPP Disturbed module and Water Erosion Prediction Project (WEPP) Road module. The WEPP models estimate average annual runoff but does not estimate peak flows. Results of the Disturbed and Road WEPP runs for Alternative A, which only considers the runoff on treated areas, are presented in table 3-23.

Based on a 30-year simulated rainfall record, runoff for the project area would decrease slightly from an average annual runoff of 0.65 acre-feet under existing to 0.62 acre-feet (refer to table 3-23). This decrease is due to improvements at the crossing of FS Road 1023 right-of-way at the West Fork of Johnson Creek in Section 31, and improved road maintenance activities along National Forest roads, as discussed in Chapter 2 under Features Designed to Reduce Sediment from Existing Roads.

**Table 3-23. Summary of runoff to streams under Alternative A and Alternative B**

| Source | Alternative A (ac-ft) | Alternative B (ac-ft) |
|---|---|---|
| Hillslopes | 0.44 | 0.02 |
| Roads | 0.18 | 0.63 |
| Totals | 0.62 | 0.65 |

By comparing the average annual yield of the Johnson Creek basin of an estimated 5,000 acre-feet (Hortness and Berenbrock 2001), to the a 0.03 acre-feet change in water yield, this only amounts to a less than 1% change in water yield. A value this low would be very immeasurable against the natural variability of stream flow conditions. Due to the immeasurable difference in runoff and that the Wrenco project area is about 10% of the Johnson Creek watershed, peak flow increases would not be detected.

**Water Quality -** As described in the Methodology section, sediment delivery from the project site for the proposed alternative was estimated using the disturbed and road WEPP modules, as well as the associated sediment delivery risk with stream crossing.

Results of the Disturbed model for Alternative A, which only considers the erosion on treated areas, are presented in table 3-24. The average annual sediment delivered to area streams from the project area due to vegetation treatment and fuels reduction is estimated to increase by about 0.0014 tons per treated acre to a total of 0.87 tons per year. This increase would originate on lands treated by prescribed fire and should diminish to pretreatment conditions as vegetation reestablishes itself in these areas. The probability that sediment would be delivered to area streams in the first year after treatment varies from 3 to 30% depending on location.

**Table 3-24. WEPP Model results of sediment yield to streams for Alternatives A and B**

| Source | Alternative A Preferred Alternative (tons/year) | Alternative B No Action (tons/year) |
|---|---|---|
| Hillslopes | 0.87 | 0 |
| Roads | 0.94 | 2.38 |
| **Totals** | **1.81** | **2.38** |

The WEPP Road model indicates that road construction would result in new sediment sources, which could potentially enter streams at new stream crossings. This is especially true where steep grades are found close to a crossing. However, the average annual sediment yield is expected to

decrease from existing conditions (2.38 tons/yr) to 0.94 tons per year due to improvements made on existing roads as well as implementing the design features in Chapter 2. These improvements include installation of a crossing on FS Road 1023 right-of-way at the West Fork of Johnson Creek in Section 31, removal of the bridge on West Fork Johnson Creek, and improved maintenance on existing roads (see Chapter 2, Features Designed to Reduce Sediment from Existing Roads).

Cumulatively, sediment yields under Alternative A compared to existing conditions would decrease by 0.57 tons on an average annual basis. Further benefits to the watershed would accrue with the decommissioning of the 1023 portion. An estimated 170 tons of sediment would be removed through the removal of the failing bridge and two stream crossings.

**Fisheries** - To protect the aquatic environment, no riparian harvest is proposed and buffers would be implemented per the INFS guidelines (see Appendix A). In addition, BMPs would be followed (see Appendix B) and timing restrictions would be observed for road repair and construction activities associated with stream crossings (see Chapter 2 for specific design features).

Some short-term impacts on the stream channel would likely occur during the construction, and subsequent storage, of stream crossings associated with the new roads and the repair of existing stream crossings. Using BMPs and timing restrictions, these impacts should be minimized, but the loss of, or other impacts to, macroinvertebrates and other aquatic insects may occur. Generally, macroinvertebrate species adapted to highly variable stream environments are better able to tolerate change than those in more stable lake and pond environments (Mackie 2001). Impacts on species abundance and diversity resulting from catastrophic substrate loss or degradation are well documented. Macroinvertebrate community response studies (Resh et al. 1988) have shown that recolonization within a few years generally results, though responses can vary within an individual species. Direct impacts on fish would likely be minimal in that they would be able to avoid the physical aspects of construction.

Three sites on the West Fork Johnson Creek (two log culverts and an old bridge) would be removed under this alternative. These existing stream structures appear to be contributing sediment to the West Fork Johnson Creek and have the potential to contribute large amounts of sediment in the event of a catastrophic failure (project file - aquatics). These observations were qualitative in nature and were made during fisheries surveys. Using BMPs during removal and replacement, sediment discharge from those locations would be minimal. Removal of the aforementioned culverts and bridge would likely increase short-term sediment production but greatly reduce or remove sediment production from these areas over the long term.

**Fry Emergence**

Fry emergence is the ability of eggs to survive and hatch to become fry, and then survive to emerge from the gravels. The 1987 Forest Plan includes a standard for maintaining 80% fry emergence success. However, the IPNF has determined and disclosed that a number for fry emergence cannot be accurately determined (1989 Forest Plan Monitoring Report and all NEPA documents subsequent to the Douglas Fir Beetle Project). In addition, the use of models cannot generate a valid number for fry emergence. Therefore, determining the effects of the project on fry emergence, without knowing the number for fry emergence, is conducted as follows:

- Analyze the effects on sediment, water yield, and other parameters that potentially affect salmonid spawning on threatened, endangered, and MIS fishes (see the discussions on the Direct and Indirect Effects).

- Address the effects to beneficial uses, which include salmonid spawning in all occupied streams in Idaho. Fry emergence is one element of salmonid spawning (see the discussions on the Direct and Indirect Effects).

Although the number for fry emergence before and after the proposed activities is not measurable, the immeasurable change in water yield and the decrease or elimination of sediment delivery into occupied fisheries streams over the long term, as a result of project activities, would be expected to improve fry emergence (see the cumulative effects discussion for fisheries below for information on an amendment to the Forest Plan that removes the fry emergence standard).

**Summary**

Removal of the aforementioned culverts and bridge, along with the construction of stream crossings for the new roads would likely increase short-term sediment production. However, sediment production within the project area would be reduced in the long term by this alternative by the removing the existing sediment sources, the decommissioning of the portion of Road 1023 within the RHCA and the storage of newly constructed roads. There would not be a measurable change in water yield in fish-bearing channels. In addition, based on the above discussions, the beneficial uses for the Johnson Creek drainage, as they relate to fisheries, would be maintained or improved as a result of the project activities.

### *Alternative B - No Action*

The No Action Alternative would result in water and sediment yields similar to the existing condition until there is a naturally induced change in the landscape such as catastrophic wildfire. A catastrophic wildfire would greatly increase water and sediment yield from the project area until vegetation cover is reestablished. Because the timing, extent, and severity of such a fire are not known, the quantitative changes due to fire are not analyzed. Instead, the quantitative effects of maintaining the existing condition are presented in this section.

**Water Yield** - For an initial period before any catastrophic fire occurs, water yield would be similar to that calculated for the existing condition (see table 3-21). If a catastrophic fire occurs, water yield would greatly increase until vegetative cover reestablishes.

**Water Quality** - Sediment yield would remain similar to the existing condition documented in table 3-22 for the short term. Table 3-22 indicates the expected average annual sediment yield from hillslopes and roads for the existing condition is 2.38 tons. However, an eventual catastrophic fire would greatly increase sediment yield from the project area until revegetation is reestablished.

An indirect effect of the no action alternative is potential future sediment releases from an unmaintained segment of FS Road 1023 along the West Fork of Johnson Creek. This segment includes two log culverts and one abandoned log bridge. These structures are subject to future plugging or overtopping during peak flows, and their failure would release sediment to the stream. In addition, a steep section of the road south and west of the log bridge would continue to contribute sediment to the West Fork of Johnson Creek. These impacts would not occur under the proposed action, which would remove the log culverts and bridge and recontour the steep portion of the road.

**Fisheries** - Under this alternative, no new activities would directly affect aquatic resources or habitat in the project area. Indirectly, habitat conditions on National Forest System lands in the Johnson Creek drainage should continue to recover from historic natural and man caused disturbances (i.e., fire and logging) including the three areas that are currently contributing

sediment to the system (assuming no catastrophic failure of these structures would occur). As such, long-term sediment yields would be expected to decline. Fish recovery in this system would depend on a variety of elements including but not limited to; how quickly sediment moves downstream, quality and stability of aquatic habitat and/or water quality and quantity. Portions of the watershed have high gradient riffles that can efficiently move sediment from the system. Natural stream grade, habitat depth, pool quality and in-stream cover should improve over time. Fish habitat is likely to stay the same or improve slightly within the analysis area under the No Action Alternative.

Existing roads have already been removed from productivity. In the event of a natural disturbance (fire and/or major precipitation events), an indirect effect of Alternative B would include the potential of a severe fire occurring during dry soil conditions and creating a hydrophobic soil highly susceptible to erosion. A major precipitation event after a high severity fire could cause large amounts of runoff and erosion to the stream systems within the project area and cause significant impacts to the aquatic habitat and its species.

Although under this alternative there would be no short term increase in sediment from the construction and subsequent storage of new roads, the potential for future sediment releases associated with the portion of Road 1023 within the RHCA of the West Fork of Johnson Creek and the three existing point sources of sediment delivery (two log culverts and one log bridge) would continue to pose a potential threat to the aquatic habitat of this stream.

## Cumulative Effects

### *Analysis Area*

The cumulative effects area (figure 3-9, map packet) includes the entire drainages of Johnson Creek and the West Fork Johnson Creek to their confluence with the Pend Oreille River. The proposed treatment area of the Wrenco project area encompasses 612 acres of forest, almost 10 percent of the area of the two basins. The cumulative effects area does not extend beyond the confluence with the Pend Oreille River because the Johnson Creek drainage is only about 0.05 percent of the Pend Oreille River basin area upstream of the confluence. To evaluate cumulative effects on the Pend Oreille River, it would be necessary to investigate all activities in an almost 24,000 square mile basin.

### *Past, Present and Reasonably Foreseeable Actions*

Cumulative effects include past, present and ongoing, and reasonably foreseeable actions, which have impacts on the environment. Past actions that could affect aquatic resources include timber harvesting, road construction, and homesteading. Activities that have occurred in the past, are still occurring, and may continue to occur in the future are timber harvest, motor vehicle use (on and off-road), road maintenance, urban development, and wildfire suppression. Reasonably foreseeable actions also include timber management on private and state lands.

### Past Activities and Events

**Timber Harvesting** - Timber harvesting within the cumulative effects area has focused on salvage logging following the 1926 fires, as well as timber sales on Riley Creek property and small private parcels. The majority of past timber harvesting listed in table 3-1 was scattered across the project area.

Research as shown that prior to the implementation of Best Management Practices (Megahan et al 1992) and the Idaho Forest Practices Act (Seyedbaghari 1996), impacts to water resources were

greater than management practices today. Therefore, it is likely that past harvest activities contributed sediment and possibly increased peak flows to project area streams due to the lack of proper protection measures. However, the condition of the watershed today appears that it has largely recovered from any possible effects that occurred during that time.

**Road Construction -** The dominant source of sediment within the Johnson Creek cumulative effects area has been caused by road construction activities. Numerous research studies have documented that forest roads are usually the leading contributors of sediment to stream channels (Gucinski et al 2001, Bilby et al 1989, Duncan et al 1987). Road construction activities started within the project area around the 1920s following the salvage logging from the 1926 fires. Roads constructed within riparian areas and crossing streams would have had the biggest impacts. Within the project area, the construction of the Forest Service Road 1023 within the riparian zone and at stream crossings would have impacted the West Fork of Johnson Creek by introducing sediment during the construction and subsequent use. However, this road has revegetated, and it appears that the main sediment risks are associated with the three point sources discussed previously. . Other existing roads within the project area are located away from the stream and pose little to no sediment risk.

**Urban Development -** Homesites have been developed throughout the private lands not currently owned by timber companies, and roads have been constructed to access public and private timberlands as well as the small private parcels. All of these activities have undoubtedly had some effect on stream hydrology and habitat although no studies have quantified these effects. Of the various current and ongoing activities within the Johnson Creek Basin, urban development and road construction are likely to have the greatest effect on hydrology, water quality, and aquatic habitat.

## Present and Ongoing Activities

**Fire Suppression Activities -** Over the last century, fire suppression activities within the Johnson Creek watershed have allowed stands to progress towards climax vegetative condition. The current trend is toward more shade tolerant species that are not as long-lived and are more susceptible to insects and disease (Forest Vegetation section).

Fire suppression activities would continue in the basin. Lack of periodic fire could have the negative impact of increasing fuel supplies and eventually increasing the likelihood of intense fires. Such a fire would likely result in increases in runoff and sediment entering area streams. However, it is expected that private landowners are reducing fuel loads through management practices similar to those proposed for the project area, potentially offsetting impacts due to fire suppression.

**General Motor Vehicle, Off Road Vehicle Use on Roads -** Motor vehicle use on private lands would increase as urban development continues, but motor vehicle use of project area roads would return to its current minimal use because of road closures in this area.

## Future Foreseeable Actions

**Urban Development -** Residential construction within the cumulative effects area will continue to increase, as Bonner County is experiencing exponential growth. County regulations require that a stormwater runoff best management practices (BMPs) be implemented before any new construction is started. These practices are tailored to minimize or prevent impacts to water quality through surface erosion and sedimentation.

**Timber Harvesting on Idaho State Lands and Private Industrial Lands -** Riley Creek Lumber Company is proposing to helicopter and tractor log 240 acres (see table 3-1). The proposed timber sale is not located near any perennial stream channels and should not have an impact on water quality. Plus, Riley Creek is required to meet the Idaho Forest Practices Act, which requires all land owners to use practices that prevent impacts to stream channels and water quality.

**Fry Emergence Amendment Environmental Analysis –** The Idaho Panhandle National Forests has issued a Fry Emergence Amendment Environmental Assessment for public comment. As proposed, this would amend Forest Plan objectives, standards, and monitoring requirements for fry emergence. The amendment represents a programmatic decision and therefore will have no direct effects on forest resources, including water quality, fish and other aquatic biota, and their habitat. Due to the performance based direction in INFS, and protections provided by other policies, laws and direction, there will be no indirect effects to forest resources, including water quality, fish, and other aquatic biota

### *Alternative A – Proposed Action*

Effects of past, current and future management are not anticipated to act cumulatively with this alternative to adversely affect aquatic resources. Although impacts in the basin may increase due to continued urban development, road construction, road maintenance and use, small holding timber management, and fire suppression, the direct effects of Alternative A are predicted to be immeasurable in the basin and therefore would not act cumulatively with effects not related to the proposed activities.

Runoff is expected to decrease by an average annual amount of 0.03 acre-feet, a very small fraction of the estimated annual basin runoff of 5,000 acre-feet. Runoff would continue to remain close to existing levels after completion of the proposed action as skid trails revegetate and new roads are placed in storage.

Sediment delivery to area streams is also expected to decrease below existing levels throughout the project area, in part because a portion of FS Road 1023 along the West Fork of Johnson Creek would be recontoured and log culverts and bridges would be removed, reducing potential sediment sources. Other maintenance activities on existing roads in the project area would also minimize the sediment delivery to streams. Finally, fuel reduction in the area would reduce the potential of intense fire in the future, thus reducing the probability of large increases in sediment yield in the future. All of these activities would result in a net reduction of sediment over time; therefore, there should not be any cumulative effects.

**Aquatic Habitat –** Although project activities would likely increase sediment in the short term as a result of road construction, road decommissioning and culvert removal, the proposed action would decrease delivery of sediment to streams within the cumulative effects area in the long term by removing existing culverts prone to failure, by decommissioning the portion of Road 1023 that lies within the RHCA of the West Fork Johnson Creek and by putting newly constructed roads into storage following project activities. In the long term, this reduction in sediment is expected to increase the effectiveness of fish habitat within the Johnson Creek drainage. In addition, there would be no expected changes in water temperature, large woody debris frequency, bank stability, undercut banks, width to depth rations, or pool quality and frequency, since there would be no harvest related activities within the RHCAs as defined by the INFS buffers. Any change in water yield would not be measurable in fish-bearing channels. Due to the presence of westslope cutthroat trout within the action areas, project activities may impact

individuals or habitat, but would not likely contribute to a trend toward Federal listing or cause a lose of viability to the population or species.

### *Alternative B – No Action*

Because Alternative B would not directly result in measurable impacts on aquatic resources in the Johnson Creek basin, it would not act cumulatively with other drainage activities to adversely affect basin aquatic resources. Water yield and sediment delivery would remain the same, except that failure of the log culverts or bridge along FS Road 1023 near the West Fork of Johnson Creek would increase sediment loads in that stream. An indirect effect of this alternative is the lack of fuel reduction activities, which would result in increased probability of intense fire in the project area, and which could also spread through other portions of the basin. If this eventwere to occur, it would result in greatly increased runoff and sediment delivery to the streams.

**Aquatic Habitat -** For the No Action Alternative, the cumulative effects relating to past, current, ongoing, and reasonably foreseeable events are similar to those discussed in the proposed action. Without the watershed improvements in place, it would take longer for the system to equilibrate.

### *Consistency with Forest Plan and Other Laws and Regulations*

#### Idaho Panhandle National Forests Forest Plan

*Alternative A*

**Water Quality -** Alternative A as planned, including its potential cumulative effects, complies with the Forest Plan, the Inland Native Fish Strategy, the Clean Water Act, the Endangered Species Act, and other regulatory requirements. By restoring seral tree species and reducing fuels, the proposed action reduces the risk of an intense, stand-replacing fire that would significantly increase runoff, erosion, and sediment delivery to streams. This action is consistent with direction in the Forest Plan to maintain high quality water to protect fish habitat, water based recreation, public water supplies, and be within state water quality standards, and with the Clean Water Act. Use of cable logging and winter tractor harvest in appropriate areas would also minimize ground cover disturbance. Maintenance of ground cover through these techniques would minimize increases in water yield and sediment delivery to area streams. Improved maintenance on existing roads, decommissioning of a portion of FS Road 1023, and storage of new roads after project completion would also contribute to attainment of mandated water quality objectives. Since there would be a net reduction in sediment with this alternative, the requirements of the Clean Water Act and the beneficial water uses mandated by the Idaho administrative codes would be achieved.

**Aquatic Habitat -** Using the design criteria, (see Chapter 2), standard best management practices, and proposed INFS buffers, Alternative A would be consistent with the Forest Plan and the Clean Water Act objectives of maintaining or improving water quality and soil conservation. The above criteria would reduce sediment yield from existing sources and eliminate potential point source structure failures along West Fork Johnson Creek, while minimizing effects on surface water from timber management. Alternative A wound be consistent with Forest Plan objectives of maintaining or improving fish populations or their habitats.

Proposed activities would comply with the guidelines in the Soil and Water Conservation Handbook (Forest Service Manual 2509.22), which outlines BMPs that meet the intent of the water quality protection elements of the Idaho Forest Practices Act.

*Alternative B*

**Water Quality -** The no action alternative would continue to meet water quality and aquatic habitat requirements of the regulatory framework in the short term. Runoff from the project area is minimal and sediment delivery to streams almost non-existent. However, Alternative B would not meet all the mandates of the Forest Plan and other requirements. Allowing the present forest species to grow without fuel reduction would lead to a condition that increases the risk of intense fire and the attendant increases in water yield and sediment yield. In addition, allowing the log culverts and log bridge to remain in FS Road 1023 would eventually result in the failure of these structures and release of sediment into the West Fork of Johnson Creek. Recontouring of a portion of FS Road 1023 and improved maintenance of existing roads would not occur under this scenario and would also contribute to eventual water quality problems in the Johnson Creek basin.

**Aquatic Habitat -** Under the No Action Alternative, existing sediment (from several stream crossings) input would continue, as would the probability of future erosion; therefore, this alternative would not be consistent with management objectives.

*Fry Emergence (Fish Standard 1 and 2):*

The objectives for fisheries in the Forest Plan state that the forest "will be managed to maintain and improve fish habitat capacities in order to achieve cooperative goals with the State Fish and Game Department and to comply with state water quality standards. Sediment arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent fry emergence success as measured from pristine condition (II-7). The first two standards for fish use similar language (II-29). The Fisheries/Watershed Analysis to determine effects of land management activities on fry emergence is described in Appendix I (I-1, 2).

Appendix I requires that if, during the environmental assessment process, cumulative effects of the proposed and past activities on stream sedimentation are projected to result in greater than 20 percent reduction in fry emergence, then additional detailed analysis will be undertaken. The analysis, along with best professional judgment, is then used to determine the significance of the project on water resources. This information is then presented to the line officer, who incorporates socio-economic and multi-resource considerations and makes a decision on the project. If the project is judged to have a "significantly negative effect" on water resources, it will be reviewed by the State for conformance with water quality standards prior to the final decision.

At the time the Forest Plan was written, models determining fry emergence (e.g. Stowell et al. 1983) were popular. These empirical models were later found to have limited application and were unreliable outside of where they were developed (J. Kershner, personal communication). In addition, the use of fry emergence survival (regardless of the threshold) as a surrogate for viability came into question, primarily for two reasons:

- First, fry emergence is highly variable. This can be due to changing natural conditions (e.g. floods, temperature regimes, geology) or human-induced causes (e.g. increased sediment input, chemical spills). Both agents are at work in most cases so it is difficult to determine what proportion of egg-to-fry mortality is due to each cause. As a result the underlying relationship between sediment in redds and survival is difficult to predict (Chapman 1988).

- Second, and more important, egg-to-fry mortality is usually density-independent (i.e. a percentage of fry will survive regardless of the number of eggs). This means that in most cases there are enough fry to inhabit all available habitat within a stream. Therefore fry-to-smolt (sub-adult) survival, where density dependent mortality plays a significant role, is a more effective and appropriate predictor of population viability than egg-to-fry survival (for a review of these concepts see Hilborn and Walters 1992). Currently the indicator used as a surrogate of fry-to-smolt survival is stream habitat characteristics.

The 1989 Forest Plan Evaluation and Monitoring Report documents the change away from the use of the fry emergence standard (Item G-1, pages C-1 and C-2). After two years of monitoring by measuring and analyzing the intergravel fines of approximately 610 core samples from 25 streams across the forest, no determinations on fry emergence success or trends were possible due to high variability. As a result, the findings were that it was not a good monitoring tool to report stream health. G-1 was combined with item G-3, which includes a comprehensive array of fisheries and hydrology parameters.

Based on the above information, it is not possible to generate an accurate percent of fry emergence. Therefore, additional detailed analysis was undertaken and that information was used to determine the significance of the project on water resources, as required by the Forest Plan (see section 1.1 Aquatic Resources for the watershed and fisheries analysis).

In conclusion, this project complies with Forest Plan direction because, although fry emergence was not computed, a detailed analysis of the effects to fish habitat and water resources was developed as required in Appendix I. This information has been presented to the line officer. Although the project will not have a significantly negative effect on water resources, the Idaho Department of Environmental Quality (DEQ) was sent documents describing the proposed activities and given the opportunity to comment. No comments were received from DEQ regarding the proposed activities.

The Idaho Panhandle National Forests is in the process of amending the Forest Plan to remove objectives, standards and monitoring requirements pertaining to fish fry emergence. The documentation will be contained in the Fry Emergence EA; with implementation expected in June 2005. This is a reasonably foreseeable action related to the Wrenco project.

### *National Forests Management Act - Species Viability*

Under both alternatives, the risk to population viability of westslope cutthroat or rainbow trout populations in terms of habitat effects would be very low on National Forest lands. This is consistent with the Forest Plan standard of managing the habitat of sensitive species to prevent further declines in populations. INFS standards would be applied where applicable to promote the long-term integrity of stream channels and riparian vegetation and contribute to the attainment of riparian habitat objectives.

Fish species that may be affected by the project are also distributed across the Forest. For example, westslope cutthroat trout currently occur in 100 percent of 4$^{th}$-code watersheds on the Forest. There is no connectivity between the Pend Oreille Lake watershed, which includes Johnson Creek, and nine other 4$^{th}$-code HUC watersheds.

At the smaller watershed scale (e.g. Johnson Creek, a 6$^{th}$-code HUC watershed), westslope cutthroat are known to inhabit 100 percent of the watersheds in the Pend Oreille Lake basin.

Based on the distribution of species across the Forest, the lack of connectivity between large watersheds, and the limited cumulative effects area (i.e., potential effects are limited to the

Johnson Creek watershed), the Wrenco Loop Project would not affect viability of any threatened, endangered, sensitive, or MIS fish species on the Idaho Panhandle National Forests.

Table 3-25 provides a determination of effects for special status fish species in accordance with the streamlining sensitive species analysis process.

**Table 3-25. Summary determination of effects for special-status fish species[1]**

| Threatened, Endangered and Sensitive Species | No Impact | May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species | Will impact individuals or habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species[2] | Beneficial Impact |
|---|---|---|---|---|
| westslope cutthroat trout (*Oncorhynchus clarki lewisi*) | Alt. B | Alt. A | | |
| bull trout *Salvelinus confluentus* | Alt A, B | | | |
| Kootenai River white sturgeon (*Acipenser transmontanus*) | Alt. A, B | | | |
| burbot (*Lota lota*) | Alt. A, B | | | |
| interior redband trout (*Oncorhynchus mykiss gairdneri*) | Alt. A, B | | | |

1 In accordance with the streamlining sensitive species analysis process, a copy signed by the IPNF fisheries biologist is found in the PF - Aquatics.

2 Considered a significant action in NEPA

# Air Quality

## *Regulatory Framework*

Current direction to protect and improve air quality on National Forests is provided by:

- Forest and Rangeland Renewable Resources Act of 1974 (16 U.S.C. 1601), as amended by the National Forest Management Act (16 U.S.C. 1602)
- Federal Land Management Policy Act of 1976 (43 U.S.C. 1701)
- Clean Air Act amendments of 1977, 1990, 1999 (42 U.S.C. 7401-7626); the Clean Air Act (Section 110) requires each State to develop a State Implementation Plan (SIP) to identify how the State will attain and maintain national air quality standards

Page II-34 of the Forest Plan (Forestwide standards) says:

- Participate with the State and others in the development and implementation of State Implementation Plans (SIP) that are compatible with management objectives for the Idaho Panhandle National Forests
- All projects, contracts, and permits must comply with procedural and substantive requirements of the Clean Air Act, State Implementation Plans and State Smoke Management Plans
- Develop and use alternative slash (biomass) disposal methods that are practical and biologically sound
- Encourage utilization of forest products to reduce biomass, which must be disposed of otherwise

There are no management area standards for air quality.

The EPA has established National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), lead (Pb), sulfur dioxide (SO2), particulate matter smaller than 10 microns (PM10), ozone (O3), and nitrogen dioxide (NO2). The State of Idaho has adopted State air quality standards for these pollutants that are equivalent to the NAAQS. Federal regulations have also been developed for particulate matter smaller than 2.5 microns (PM2.5).

Primary NAAQS are the levels of air quality necessary, with an adequate margin of safety, to protect public health. National secondary standards are the levels of air quality necessary to protect the public welfare from known or anticipated adverse effects of a regulated air pollutant. Table 3-26 lists the national and Idaho air quality standards. Air quality standards are listed in units of concentration in parts per million (ppm) and/or mass concentration in micrograms per cubic meter (µg/m3), as appropriate.

## *Methodology*

### Analysis Area

The cumulative effects analysis area for smoke, road dust, and other related effects are difficult to tie to a specific geographic area. The distance that smoke and dust will travel is dependent on numerous factors, including the prevailing winds, local winds, inversions, the amount of smoke generated from a burn, the amount of fuel to consume, the stability of the atmosphere, and others. However, since the project area is located in northern Idaho, only a short distance from Montana, it is reasonable to consider the cumulative effects area to be northeastern Idaho and northwestern Montana.

### Analysis Methods

Emission production modeling was completed for each alternative using the First Order Fire Effects Model (FOFEM; see PF-Air Quality). This model is a software program designed for resource managers to estimate woody fuel consumption and smoke production for forest standards (Reinhardt et al. 1997). FOFEM estimates the total pounds per acre of CO, $PM_{10}$ and $PM_{2.5}$ that would be generated by burning.

Actual ambient concentrations of pollutants during the burning period cannot be modeled directly, but the estimates of total pollutant production provide a basis for comparing the impacts of each alternative. The rate of smoke production in pounds per acre can be used to help determine the amount of acreage to be burned at one time.

**Table 3-26. Ambient air quality standards**

| Pollutant | Averaging Time | Concentration | Comments |
|---|---|---|---|
| Ozone | 8 Hour | 157 µg/m3 | |
| (0.08 ppm) | National Primary and Secondary Std. | | |
| | 1 Hour | 235 µg/m3 | |
| (0.12 ppm) | National Primary and Secondary Std. and Idaho Std. | | |
| Carbon Monoxide | 8 Hours | 10,000 µg/m3 | |
| (9.0 ppm) | National Primary and Secondary Std. and Idaho Std. | | |
| | 1 Hour | 40,000 µg/m3 | |
| (35 ppm) | National Primary Std. and Idaho Std. | | |
| Nitrogen Dioxide | Annual Arithmetic Mean | 100 µg/m3 | |
| (0.05 ppm) | National Primary and Secondary Std. and Idaho Std. | | |
| Sulfur Dioxide | Annual Arithmetic Mean | 80 µg/m3 | |
| (0.03 ppm) | National Primary Std. and Idaho Std. | | |
| | 24 Hours | 365 µg/m3 | |
| (0.14 ppm) | National Primary Std. and Idaho Std. | | |
| | 3 Hours | 1,300 µg/m3 | |
| (0.5 ppm) | National Secondary Std. and Idaho Std. | | |
| Particulate Matter as PM10 | Annual Arithmetic Mean | 50 µg/m3 | National Primary Std. and Idaho Std. |
| | 24 Hours | 150 µg/m3 | National Primary Std. and Idaho Std. |
| Particulate Matter as PM2.5 | Annual Arithmetic Mean | 15 µg/m3 | National Primary Std |
| | 24 Hours | 65 µg/m3 | National Primary Std. |
| Lead (Pb) | Quarterly Arithmetic Mean | 1.5 µg/m3 | National Primary Std. and Idaho Std. |

Source: IDAPA 58.01.01.577 Rules for the Control of Air Pollution in Idaho; 40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards.

During the burning season, smoke management procedures are followed to minimize the accumulation of smoke in Idaho and Montana. A Missoula-based monitoring unit is responsible for coordinating prescribed burning in north Idaho year-round. This unit monitors meteorological data, air quality data, and planned prescribed burning and makes a decision daily on whether burning restrictions are needed the following day.

## Affected Environment

Prevailing winds in the area are from the west-southwest, with some local influences due to topography. Air quality in the project area is affected by air pollutant emissions from fugitive sources including agriculture, road dust, and wood smoke. Industrial sources of air pollution also contribute to air contaminant concentrations. Idaho DEQ ensures compliance with the NAAQS through regulations and air quality permits which are contained in the Idaho State Implementation Plan (SIP). Conditions of the air quality permits ensure that emissions from permitted industrial sources would not cause or contribute to a violation of the NAAQS. Several permitted sources are located in the vicinity of the project area (see Air Quality – project file).

The attainment status for pollutants within the project area is determined by monitoring levels of criteria pollutants for NAAQS exist. Air quality in the immediate project area is in compliance with the NAAQS, and is therefore classified as "attainment" for all criteria pollutants. A "non-attainment" designation means that violations of the Idaho standards of the NAAQS have been documented in the region. A portion of Bonner County, including 15 sections in and around Sandpoint, has been designated as a non-attainment area for $PM_{10}$. The closest boundary of the non-attainment area is approximately eight miles east of the project area. Idaho DEQ has implemented measures to correct the $PM_{10}$ violation in the Sandpoint area, and the improvements are reflected in the ambient monitoring data.

$PM_{10}$ and $PM_{2.5}$ monitors have been operating in Bonner County at a monitoring station located on the post office in Sandpoint, approximately 10 miles east of the project area. PM10 data has been collected in Boundary County using monitors in Bonners Ferry, approximately 36 miles northeast of the project area. $PM_{10}$ concentrations have decreased significantly at the Sandpoint monitoring station since monitoring began. The Air Quality portion of the project file lists the available air quality monitoring data for the Sandpoint monitor for the past 10 years, and available data from the Bonners Ferry monitor.

EPA's Prevention of Significant Deterioration of Air Quality (PSD) program includes provisions for classifying airsheds based on the characteristics of the area. The highest level of protection is provided by the Class I designation, which is applied to pristine lands. The closest Class I area is the Cabinet Mountains Wilderness Area in northwest Montana, approximately 50 miles northeast of the project area. The Spokane Indian Reservation in Washington is also a designated Class I area under the PSD regulations, and lies approximately 50 miles southwest of the project area.

The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. The project area lies in a Class II airshed. Impacts to the Class II airshed would be reflected in the monitoring data from the $PM_{10}$ and $PM_{2.5}$ monitoring sites in Sandpoint and Bonners Ferry.

## Environmental Consequences

### Direct and Indirect Effects

#### Alternative A - Proposed Action

The proposed action includes two types of prescribed burning to treat both activity-created and natural fuels. Slash from timber harvesting and thinning would be eliminated by grapple piling and burning, and by prescribed burning.

Underburning would be used to reduce woody debris, provide site preparation for natural or artificial regeneration, and eliminate unwanted vegetation. Underburning may have a short-term impact on air quality because of slow ignition, which causes lower fire intensity, and relatively high fuel moistures that often occur in spring and fall burns. Prescribed burning would be carried out when meteorological conditions are conducive to rapid dispersion of smoke from the project site.

Pile burning would be used to dispose of woody debris. Pile burning is conducted in the late fall during wet and often snowy conditions. The majority of piles are created using an excavator, which virtually eliminates dirt and other non-combustible debris from the piles. Pile burning produces lower smoke emissions per unit of fuel consumed than underburning (EPA 1996).

The result of the prescribed burning would be increased smoke within the immediate vicinity of each burn on the day of the burn with the possibility of increased concentrations at the lower elevations in the event of a nighttime inversion. This would occur only on the day of the burns, with only scattered, minor drift smoke possible for two to three days after that. To limit the potential effects of inversions, the Montana/Idaho State Airshed Group would only allow burns to be conducted when good or excellent dispersion conditions are indicated.

Air quality impacts from the proposed project would result primarily from burning. Logging equipment would produce temporary emissions of engine exhaust and fugitive dust emissions from vehicle traffic on and off roads.

The FOFEM model has been used to estimate emissions from the proposed underburning and pile-burning activities. Results from the emissions estimates are contained in table 3-27.

According to the "Decision Analysis for Smoke Modeling," as outlined in the document Describing Air Resource Impacts from Prescribed Fire Projects in NEPA documents for Montana and Idaho in Region 1 and Region 4, any project that generates more than 100 tons of any one pollutant ($PM_{2.5}$, $PM_{10}$ or total suspended particulate (TSP)) per year must be further analyzed using the NFSPUFF model: An Air Quality Model for Smoke Management in Complex Terrain (Reinhardt et al. 1997). Table 3-27 shows the total estimated $PM_{2.5}$ and $PM_{10}$ emissions that would be generated by all of the prescribed underburning and pile burning combined throughout the life of the project. Based on EPA's emission factor reference materials for wildfires and prescribed burning, TSP emissions from wildland fires are estimated to be 141 percent of the $PM_{2.5}$ emissions, or 78 tons total (EPA 1996).

**Table 3-27. Estimated $PM_{10}$, $PM_{2.5}$ and CO emissions**

| Pollutant | Alt. A |
|---|---|
| $PM_{10}$ from underburning (lb/acre) | 322 |
| $PM_{2.5}$ from underburning (lb/acre) | 272 |
| CO from underburning (lb/acre) | 3,136 |
| $PM_{10}$ from pile burning (lb/acre) | 180 |
| $PM_{2.5}$ from pile burning (lb/acre) | 153 |
| CO from pile burning (lb/acre) | 1,419 |
| Total Tons $PM_{10}$ | 65.1 |
| Total Tons $PM_{2.5}$ | 55.2 |
| Total Tons Carbon Monoxide | 555 |

Estimated total emissions for $PM_{2.5}$, $PM_{10}$ and TSP for the proposed action are well below 100 tons. The prescribed burning would be done over a period of two or more years, so the annual emissions would be less than the 100 ton per year threshold that would trigger further analysis. Therefore, no additional analysis of air resource impacts is necessary.

### *Alternative B - No Action*

Under the No Action Alternative, the background sources of air pollution would remain the same. Impacts from the proposed prescribed burning project would not occur. However, the intensity and difficulty of suppression of future wildfire during the summer months would be increased. Emissions from a potential wildfire covering the entire project area would be higher than emissions from prescribed burning on comparable acreage (project file – air quality section).

## Cumulative Effects

### *Alternative A – Proposed Action*

The cumulative effects area for the proposed action is northeastern Idaho and northwestern Montana. The Proposed Action specifies prescribed burning during the fall burning season, to be performed in accordance with appropriate smoke management procedures. The goal of the smoke management program is to ensure that prescribed burns are conducted during periods in the spring and fall when atmospheric conditions promote ventilation. The proposed prescribed burning schedule would help minimize cumulative impacts by avoiding the periods of highest fugitive dust emissions and smoke from wildfires in the summer.

### *Alternative B – No Action*

Cumulative effects from the no action alternative would consist of the existing sources of fugitive air pollution and industrial emissions. Evaluation of the no action alternative must also consider the cumulative impacts from the potential smoke that would occur due to a large, long-term wildfire if no fuel treatment occurred (Reinhardt et al. 1997). If the project area burned under wildfire conditions, the amount of smoke would be much higher than under the prescribed burn alternative. The wildfire could occur during peak fire season, adding to a cumulative smoke buildup covering large areas of Idaho and Montana. Wildfires could occur during periods of high fugitive dust emissions, and the combination of sources, along with poor dispersion conditions, could result in exceeding the 24-hour NAAQS for $PM_{10}$ and $PM_{2.5}$. Exceeding these standards could impair the health of people living in the affected areas.

## Consistency with Forest Plan and Other Laws and Regulation

Burning in Alternative A would be performed in accordance with smoke management practices, which are designed to prevent the smoke from causing a violation of the NAAQS. There is little risk that a violation of any ambient air quality standard would occur as a result of the proposed action. Alternative A would be consistent with Forest Plan Standards and the Clean Air Act.

Since Alternative B does not directly create any air quality impacts, it would also be consistent with Forest Plan Standards and the Clean Air Act.

# Visual Quality

## Regulatory Framework

### Forest Plan Standards for Visual Quality

The Forestwide standard for visual quality is to meet the Forest Plan visual quality objectives as stated on page II-25 (USDA Forest Service 1987).

The visual resource has been evaluated based on visual sensitivity levels assigned to travel routes, use areas, and water bodies in and adjacent to the Idaho Panhandle National Forests. Viewpoints near the project area include U.S. Highway 2 and the Pend Oreille River, both with a sensitivity level of 1 (high concern).

Visual quality objectives (VQOs) in the project area are primarily partial retention with some modification. Partial retention is defined as "human activities may be evident, but must remain subordinate to the characteristic landscape." Modification is defined as "human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in background or middleground."

Forest Plan standards for Management Area 1 and 4 specify that areas not designated as retention or partial retention would be managed as modification or maximum modification. Existing areas that do not meet VQOs would be brought up to standard as it is cost-effective to do so.

## Methodology

### Analysis Area

The cumulative effects analysis area for visual quality is the viewshed surrounding the project area, including adjacent National Forest lands and private lands that can be seen from the viewpoints identified in the Forest Plan (U.S. Highway 2 and the Pend Oreille River).

### Analysis Methods

VQOs were assessed using guidelines contained in Agricultural Handbook 701: Landscape Aesthetics: A Handbook for Scenery Management (USDA Forest Service 1995c).

## Affected Environment

### Landscape Character

Landscape character is an overall visual and cultural impression of landscape attributes (e.g. uniform closed canopy and openings in the canopy of overstory vegetation). The character of the project area is a natural appearing, forested environment with a mix of trees and different sized rock outcrops.

Timber harvesting and road construction on private lands in the vicinity of the project area have left a landscape that appears slightly influenced by man's activities with some visual evidence of skid corridors and unnatural appearing openings in the timber canopy. The evidence of the

activities is small in scale and does not dominate the landscape but leaves the observer with the impression that the landscape has been altered to a small degree.

### Visual Sensitivity

Sensitivity levels are a measure of the public's concern for the scenic quality of the National Forests. Three sensitivity levels are used. Each identifies a different level of user concern for the visual environment. Level 1 is of highest concern and level 3 is lowest. Some of the project area is seen from certain areas along Highway 2 and the Pend Oreille River that are sensitivity level 1 viewpoints. Other portions of the project area are not seen from these viewpoints but may be seen from lower sensitivity level viewpoints like county roads with much less traffic and fewer potential viewers.

### Scenic Integrity

Scenic integrity indicates the degree of intactness and wholeness of the landscape character. Scenic integrity levels ranges include unacceptably low (extremely altered), very low (heavily altered), low (moderately altered), moderate (slightly altered), high (appears unaltered), and very high (unaltered).

When viewed from the sensitivity level 1 view points, the landscape incorporating the project area appears slightly altered, with a "moderate" scenic integrity.

## *Environmental Consequences*

Timber harvest, road construction, and fuel treatments can affect the appearance of a forested landscape due to the contrast between natural appearing landforms and vegetation and those modified by management activities. These changes are often expressed in terms of form, color, line, and texture. Visual effect generated by timber removal and associated activities will vary in duration and intensity according to the vegetation cover left on the site and the color, shape, and size of any alterations in that cover. If the alterations repeat colors, shapes and sizes of natural occurring openings, then the resulting effects of the activities will be minor and short-lived. If the activities introduce unnatural colors, shapes, and sizes of those shapes then the visual impact will be more easily discernable and longer-lived.

Management activities are designed to meet, at a minimum, the VQOs assigned by the Forest Plan. The following section describes how disturbances such as timber harvest, road construction, and fire would affect the visual resource.

### Direct and Indirect

#### *Alternative A – Proposed Action*

The proposed cutting prescriptions call for a mix of thinning and regeneration harvests. This would result in a significant amount of tree crowns being left in the project. When viewed from the oblique vertical angle of the sensitivity level 1 viewpoints, the tree crowns will tend to "stack up" obscuring the ground behind from sight. The uniform texture of the tree canopy may change to a somewhat mottled texture. Timber harvest would not result in a discernable change in form, line, and color over most of the project area. One exception to this would be the steep upper slopes of the area planned for an irregular shelterwood harvest in stand 64304049. The view angle into this area is more acute because it is steeper ground. The top of this area would be visible to the viewpoints after harvest. The vegetation removal here would repeat the form, line,

color, and texture of the natural occurrences common to the surrounding areas by creating small openings that are irregular in shape and similar in size to the natural openings on the landscape.

The proposed new road construction would not be visible from sensitivity level 1 areas. The proposed roads would be located on gentle ground where many tree crowns between the observer and the roads will obscure the view. The VQO of partial retention would be met.

### *Alternative B – No Action*

Without timber harvest or road construction there would be no effects to the scenic conditions of the area. The character of a slightly altered landscape would not change. The scenic integrity would remain the same. Over the long term, the increasing vulnerability to wildfire due to the changed conditions of the area may bring change to the scenic condition.

## Cumulative Effects

### *Alternative A – Proposed Action*

Because privately owned land adjacent to the project area has been altered somewhat, there is a contrast between the National Forest and adjacent lands, particularly west and north of the project area. Activities proposed in this project would reduce the stand density within the project area and create a more mottled texture in some areas. This would reduce the contrast between the National Forest and privately owned lands to a degree.

Activities within the project area considered in the cumulative effects analysis for visual quality include past timber harvest, road construction, wildfires, and fire suppression. A major wildfire could adversely affect the scenic quality by making roads visible from the viewpoints. Activities on adjacent private land could also reduce the scenic quality, depending on what they are. Heavy timber removal abutting National Forest property lines could result in a more noticeable contrast in size and shape of openings that would affect the view.

Inside and outside of the project area, insects and disease are expected to cause tree mortality, which would create a slight change in color and texture over time. Without a major wildfire, none of these changes is expected to be readily discernable to the casual observer.

### *Alternative B – No Action*

Because tree density would not be reduced in the short-term, the contrast between adjacent private land and the National Forest land would remain the same.

As adjacent landowners cut trees and build houses and roads, more contrast would be created between the project area and its surroundings. Inside and outside of the project area, insects, disease, and possibly wildfires are expected to cause tree mortality, introducing a small change in the form, color, and texture. None of these changes are expected to be readily discernable to the casual observer.

## Consistency with Forest Plan and Other Laws and Regulation

Both alternatives would meet visual quality objectives established in the Forest Plan, and both alternatives are consistent with Forest Plan goals and standards for visual quality.

# Project Feasibility

The effect on project feasibility was identified as an analysis issue during the scoping process. This issue focuses on the feasibility of implementing an action alternative, in this case the Proposed Action. With the exception of watershed improvements all proposed management activities are linked to the sale of commercial forest products (i.e., a timber sale).

## *Regulatory Framework*

The Forest Plan and other agency policies imply the need to develop viable projects. However, there is no direction regarding degree of viability; or of profit required.

## *Analysis Methods*

Different revenues and costs are associated with the management activities under each alternative. To arrive at the expected predicted high bid, a Transaction Evidence Appraisal (TEA) was used to determine the potential value (referred to as "stumpage") of trees removed. The TE appraisal method predicts the value through the use of several independent variables developed from recent similar sales within Region 1 of the Forest Service (Northern Idaho and western Montana). Since the information used is from actual bidding, current local market conditions and production costs for logging and milling are reflected in the predicted rate.

Cost averages were used for fuel reduction, site preparation and planting (including overhead), and grass seeding. Site -specific Forest Service cost data were used for road construction/reconstruction, and maintenance. Costs for road construction, road maintenance, reforestation, mitigation and other direct costs are deducted from the expected stumpage value. The costs of upgrading exiting road to further reduce long-term risks to the watershed are included in the road maintenance costs.

Non-commodity values were not included in this analysis because these resources are evaluated under each specific resource section. Title 40, Code of Federal Regulations for NEPA (40 CFR 1502.23) states, "For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost benefit analysis and should not be when there are qualitative considerations." Qualitative effects on resources are documented in individual resource sections.

This analysis focuses on the direct and indirect effects of proposed activities. Past, present and reasonably foreseeable activities on National Forest and other lands within the project area would not have an effect on the economic issues for these alternatives. Therefore, there would be no cumulative effects.

## *Affected Environment*

Timber sale value is affected by the size and quantity of trees harvested, species mix, methods of harvest, slash and reforestation costs, and road costs. Other factors affect sale viability as well, but these are among the most significant. External factors affecting viability are market forces that influence the private sectors ability to purchase federal timber. Imports from other countries, improved mill efficiency, loss of competition due to mill closures and other factors have caused stumpage prices to decline in recent years over much of the United States. However, stumpage for federal timber has remained relatively higher in the northern Idaho than other parts of the country.

# *Environmental Consequences*

## Direct, Indirect, and Cumulative Effects

### *Alternative A – Proposed Action*

The predicted high bid reflects the road costs, environmental protection costs, logging costs, volumes, and silvicultural prescriptions. This figure uses the value of timber removed (based on size, species and volume), yarding methods used and hauling distances. Logging, hauling, and contractual work (clean-up, fire line construction, fuel treatment, grass-seeding, and road decommissioning) costs are deducted from the value of the timber

Using a timber sale to accomplish project objectives would be economically viable under this alternative. The predicted high bid for the Proposed Action is a total sale value of $242,869.19 (project file – feasibility). Based on this value the Proposed Action is considered viable.

### *Alternative B – No Action*

Since no trees would be cut and sold with this alternative, there would be no monetary costs or revenues. Not managing the forest vegetation in this area would result in a loss of productivity over the long-term due to insect and disease mortality, and a loss of opportunity to provide usable wood products from merchantable-sized trees. This alternative does not include a timber sale. Therefore it has no bid value.

## Consistency with Forest Plan and Other Laws and Regulations

Forest-wide goals, objectives, and standards for finances are not specifically addressed in the Forest Plan. This issue was addressed indirectly in the discussion of community stability. Chapter II of the Forest Plan states, “management activities will continue to contribute to local employment, income, and lifestyles. The Forest will be managed to contribute to the increasing demand for recreation and resource protection while at the same time continuing to provide traditional employment opportunities in the wood products industry,” (Forest Plan, p. II-11). The action alternative would meet this direction.

The No Action alternative is neutral with respect to the forest plan because the plan does not require action based on economic return. The plan only sets guidance for implementing activities (i.e., a proposed action).

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# Appendix A
# Site Specific Best Management Practices

## PRACTICE 11.05 - Wetlands Analysis and Evaluation

Objective: To delineate wetlands within sale areas in order to prevent damage to facilities or degradation of soil and water resources.

*Effectiveness:* High

Compliance: FPA Rule 4.d.v (c) - Meets

## PRACTICE 13.03 - Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows

Objective: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands, bogs and wet meadows.

*Effectiveness:* Much of this mitigation consists of avoiding the impact [40 CFR 1508.20(a)]. The Forest Service has near-complete control over construction operations. Effectiveness is expected to be high.

Compliance: FPA Rule 3.h.iii - Meets

Implementation: At a minimum, the following specific protective requirements for wetlands identified on the Sale Area Map (SAM) will be incorporated into C6.62# (Site-specific wetlands protection measures):

1. Soil and vegetation along lakes, bogs, swamps, wet meadows, springs, seeps, or other sources where the presence of water is indicated will be protected from disturbance which would cause adverse effects on water quality, quantity, and wildlife and aquatic habitat (FPA Rule 3.h.iii].

An equipment exclusion zone shall extend a minimum of 50 feet from the wetlands, bogs, and wet meadows.

## PRACTICE 13.04 - Revegetation of Surface Disturbed Areas

## PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

Objective: To protect soil productivity and water quality by minimizing soil erosion.

*Effectiveness:* Revegetation can be moderately effective at reducing surface erosion after one growing season following disturbance and highly effective in later years. Effectiveness has been shown to vary from 10 percent on ¾:1 slopes to 36 percent on 1:1 slopes to 97 percent on 1:1 slopes in later years (King, John G. and E. Burroughs. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station General Technical Report, 1988).

Compliance: FPA Rules 3.d.iii & e.i, ii - Meets

Implementation: All temporary roads, landings, and skid trails in the sale area will be seeded within one year after harvesting is completed. Seed mixes and fertilizer specifications will be incorporated into Timber Sale Contract provision CT6.601# (Erosion Control Seeding). Timber

Sale Contract provision C6.633# (Temporary Road, Skid Trail/Skid Road and Landing Scarification) will identify that scarification/ripping of compacted landings and closed roads will be a minimum of four inches, not to exceed two feet.

a. All temporary roads, landings, and skid trails will also be fertilized to give the new plants extra support in becoming established.

b. The standard Idaho Panhandle National Forests moist site erosion control seed mix will be used.

### PRACTICE 14.06 - Riparian Area Designation

### PRACTICE 15.12 - Control of Construction in Riparian Areas

Objective: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

*Effectiveness:* Moderate

Compliance: FPA Rules 3.g.ii, iii, & iv; 3.f.iv - Meets

Implementation: Riparian areas will be protected through the following requirements that will be incorporated into timber sale layout, or into the timber sale contract as identified below:

1. Provide the large organic debris, shading, soil stabilization, wildlife cover, and water filtering effects of vegetation along Class I streams [FPA Rule 3.g.i-iii]. The following measure(s) are implemented during sale layout:

   (a) A Stream Protection Zone that consists of a buffer of 300 feet slope distance from the edge of the channel for fish bearing streams. No timber harvest activities shall occur within the Stream Protection Zone.

   (b) A Stream Protection Zone that consists of a buffer of 100 feet slope distance from the edge of the channel for permanently flowing non-fish bearing streams. No timber harvest activities shall occur within the Stream Protection Zone.

   (c) A Stream Protection Zone that consists of a buffer of 75 feet slope distance from the edge of the channel for the intermittent tributaries. No timber harvest activities shall occur within the Stream Protection Zone.

2. Waste resulting from logging operations, such as crankcase oil, filters, grease and fuel containers, shall not be placed inside the Stream Protection Zones [FPA Rule 3.f.iv and TSC Provision B6.34].

### PRACTICE 14.11 - Log Landing Erosion Prevention and Control;

### PRACTICE 14.12 - Erosion Prevention & Control During Timber Sale Operations;

### PRACTICE 14.15 - Erosion Control on Skid Trails.

Objective: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

*Effectiveness*: Moderate

Compliance: FPA Rules 3.e.i, ii; 3.d.iii - Meets

Implementation: The following criteria will be used in controlling erosion and restoring landings and skid trails to minimize erosion:

General:

1. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations at least 100 feet outside of the appropriate Stream Protection Zone [FPA Rule 3.f.iii].
2. Within one year of disturbance, all temporary roads, skid trails and landings will be seeded with a mix specified in C6.601# and fertilized.
3. Timber Sale Contract provision C6.633# (Temporary Road, Skid Trail/Skid Road and Landing Scarification) will identify that scarification/ripping of compacted landings and closed roads will be a minimum of 4 inches, not to exceed 2 feet.

Landings:

1. During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams.
2. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed [FPA Rule 3.e.ii].
3. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.
4. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain or spread [Provision BT6.63 (Landings)].

Skid Trails:

1. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross-draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff [FPA Rule 3.e.i].
2. The sale administrator and/or watershed specialist will designate the spacing of water bars on skid trails. [Reference FSH 7709.56]

**PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures before Sale Closure**

Objective: To assure the adequacy of required timber sale erosion control work.

*Effectiveness*: High

Compliance: No directly related FPA Rule

Implementation and Responsibility: Timber Sale Contract provision B6.36 (Acceptance of Work) requires that upon the purchaser's written request and assurance that work has been completed, the Forest Service shall perform an inspection. Areas that the purchaser might request acceptance for are specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Timber Sale Administrators will not accept as complete erosion control measures that fail to meet these criteria.

## PRACTICE 15.03 - Road and Trail Erosion Control Plan

Objective: To minimize the effects of erosion and the degradation of water quality through erosion control work and road design.

*Effectiveness:* Moderate

Compliance: No Related FPA Rule Implementation: Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. Erosion control work to be done by the Contractor will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control work necessary for all phases of the project. The Engineer will certify that the Contractors Erosion Control Plan meets the specifications of Std. FS Spec. Section 204.

## PRACTICE 15.07 - Control of Permanent Road Drainage

Objective: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

*Effectiveness:* Moderate. Designed and controlled ditches, cross drain spacing, and culvert discharge prevent water from running long distances over exposed ground.

Compliance: FPA Rules 4.c.viii; 4.d.iii (a) & (b) - Meets

Implementation: The following items will be included in the timber sale contract provisions or road contract special project specifications.

1. Drainage ways shall be cleared of all debris generated during construction and/or maintenance that potentially interfere with drainage or water quality [IFPA Rule 4(c)(ii), Timber Sale Contract Clause C5.31 (road maintenance requirements), and Standard Road Specifications-Special Project Specification 204.04].

2. During and following operations on out-sloped roads, out-slope drainage shall be retained and berms shall be removed on the outside edge except those intentionally constructed for protection of road grade fills [IFPA Rule 4(c)(vi) and Timber Sale Contract Clause C5.31].

3. Cross drains and relief culverts shall be constructed to minimize erosion of embankments. The time between road construction and installation of erosion control devices shall be minimized. Drainage structures or cross drains shall be installed on uncompleted roads which are subject to erosion prior to fall or spring runoff. Relief culverts shall be installed with a minimum grade of 1 percent [IFPA Rule 4(c)(viii) and Standard Road Specifications-Special Project Specification 204.1].

4. Cross drains and relief culverts will be installed so as to minimize concentrations of intercepted water (see also Practice 15.02 f.(3)).

## PRACTICE 15.08 - Pioneer Road Construction

Objective: To minimize sediment production and mass wasting associated with pioneer road construction.

*Effectiveness:* Moderate

Compliance: No directly related FPA Rule Implementation: The following contract specifications will be required:

5. Construction of pioneer roads shall be confined to the designed location of the road prism unless otherwise approved by the Contracting Officer (Std. FS Spec. 203.11).

6. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits (Std. FS Spec. 203).

7. Permanent culverts will be installed at wet crossings during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

## PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Stream crossing projects

Objective: To minimize erosion of, and sedimentation from, disturbed ground on incomplete projects.

*Effectiveness:* Moderate Compliance: FPA Rules 4.c.ii,iii,iv; & 4.d.iii - Meets

Implementation: The following measures will be implemented during projects:

8. Temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion will be installed as necessary. The removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossing causeways will be completed as soon as practical;

9. The removal of debris, obstructions, and spoil material from channels and floodplains;

10. Seeding with an erosion control seed mix approved for use on the Idaho Panhandle National Forests to minimize erosion.

11. Install drainage structures or cross drain uncompleted roads that are subject to erosion prior to fall or spring runoff. (Std Spec 204) Erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly “closed,” if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

## PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material

## PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

See also Practice 13.05

Objective: To insure that unconsolidated excavated and sidecast material, construction slash, and roadside debris, generated during road construction, is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

*Effectiveness:* High

Compliance: FPA Rule 4.c.iii,iv; & 4.d.i,ii,iii The slash windrow and other erosion control devices will not be placed in existing stream channels or obstruct culvert outfalls. Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

Implementation: In the construction of road fills near streams, compact the material to reduce the entry of water, minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage. Where slash windrows are not desirable or practical, other methods of erosion control such as erosion mats, mulch, and straw bale or fabric sediment fences will be used. Where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means. The following standard specs will be included in all road contracts that include clearing and excavation.

12. Standard Specification 201 (Slash Treatment)

13. Standard Specification 203 (Excavation and Embankments)

## PRACTICE 15.13 - Controlling In-Channel Excavation

Objective: To minimize downstream sedimentation by insuring that all in-channel excavations are carefully planned.

*Effectiveness:* High Compliance: SCA Rule 9,1(a) - Meets

Implementation: Location and method of stream crossings will be designed and agreed to prior to construction. The following items highlight some of the principal provisions incorporated into the TSC that will govern channel protection:

14. Construction equipment may cross, operate in, or operate near stream courses only where so agreed to and designated by the Forest Service prior to construction (B6.5). Crossing of perennial stream channels will be done in compliance with the specifications in the Stream Channel Alteration Act Rules and Regulations and included in the project specifications.

15. No construction equipment shall be operated below the existing water surface except that fording the stream at one location only will be permitted, and work below the water level that is necessary for culvert bedding or footing installations will be permitted to the extent that it does not create unnecessary turbidity or stream channel

disturbance [SCA Rule 9,1 (a) and Standard Road Specifications-Special Project Specification 204.04].

16. Wheeled or track laying equipment shall not be permitted to operate within 5 feet slope distance of the apparent high water mark of Class II streams and 75 feet of Class I streams (B6.5 Streamcourse Protection).

17. Construction of any hydraulic structures in stream channels will be in compliance with the Rules and Regulations pertaining to the Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code).

## PRACTICE 15.21 - Maintenance of Roads

Objective: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

*Effectiveness:* Moderate Compliance: FPA Rule 4.d.i, ii, iii, iv, v - Meets

Implementation: For roads in active timber sale areas standard TSC provision B5.3 (Road Maintenance) requires the purchaser to perform or pay for road maintenance work commensurate with the purchasers use. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract (C5.31# - Road Maintenance). Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in C5.32# (Road Maintenance Deposit Schedule). All maintenance work shall be done concurrently, as necessary, in accordance with T-specifications set forth herein or attached hereto, except for agreed adjustments (TSC C5.31#-T301, 310).

18. Sidecast all debris or slide material associated with road maintenance in a manner to prevent their entry into streams [IFPA Rule 4(d)(i), Timber Sale Contract Clause C5.31#, and Standard Road Specification-Special Project Specification T108].

19. Repair and stabilize slumps, slides, and other erosion features causing stream sedimentation [IFPA Rule 4(d)(ii), Timber Sale Contract Clauses C5.31#, and Special Project Specification T108].

20. Active Roads. An active road is a forest road being used for hauling forest products, rock and other road-building materials. The following maintenance shall be conducted on such roads.

    (a) Culverts and ditches shall be kept functional.

    (b) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or water barred, and berms removed from the outside edge except those intentionally constructed for protection of fills.

    (c) The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.

    (d) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams [IFPA Rule 4(d)(iii)] and Timber Sale Contract Clauses C5.31# and C6.314#-Dust Abatement Treatment].

Effectiveness: These measures should effectively minimize erosion from roads.

21. Inactive roads. An inactive road is a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.

    (a) Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, water barred or otherwise left in a condition to minimize erosion. Drainage structures will be maintained thereafter as needed.

    (b) The roads may be permanently or seasonally blocked to vehicular traffic [FPA Rule 4.d.iv].

    (c) Roads will be seeded and fertilized.

    (d) The roads may be permanently or seasonally blocked to vehicular traffic.

22. Abandoned Roads. An abandoned road is not intended to be used again. No subsequent maintenance of an abandoned road is required after the following procedures are completed:

    (a) The road is left in a condition suitable to control erosion by out-sloping, water barring, seeding, or other suitable methods.

    (b) Ditches are cleaned.

    (c) The road is blocked to vehicular traffic.

    (d) The department may require the removal of bridges and culverts except where the owner elects to maintain the drainage structures as needed.

For roads not in an active timber sale area, road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).

## PRACTICE 15.24 - Snow Removal Controls

Objective: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

*Effectiveness: Moderate*

Compliance: No directly related FPA Rule

Implementation: For Forest roads that will be used throughout the winter, the following measures will be employed (C5.316# - Snow Removal):

23. The Purchaser is responsible for snow removal in a manner that will protect roads and adjacent resources.

24. Rocking or other special surfacing and/or drainage measures may be necessary before the operator is allowed to use the roads.

25. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.

26. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

### Idaho Panhandle National Forest, Forest Plan Consistency (IPNF, II-33)

Specific management objectives in the Idaho Panhandle National Forests Forest Plan pertaining to water resources are:

27. Management activities on Forest Lands will not significantly impair the long-term productivity of the water resource and ensure that state water quality standards will be met or exceeded.

28. Idaho State Best Management Practices (BMPs) are designed to protect the long-term productivity of the water resource and ensure state water quality standards will be met. The Wrenco Loop Project will meet standard BMPs. Site-specific BMPs were also included with this project as mitigation measures to improve water quality.

29. Maintain concentrations of total sediment or chemical constituents within state standards.

    The net production and delivery of sediment from the No Action alternative is only expected to decrease if the recommendations for road reconstruction and maintenance are implemented. Alternative A would reduce the risk of production and potential for delivery of sediment to streams.

The action alternatives would likely meet State standards for chemical constituents given that “Required Design Criteria for All Action Alternative, “State and site-specific BMPs, and INFS standards would be applied if an action alternative is selected.

30. Implement project level standards and guidelines for water quality contained in the Best Management Practices.

    Specific road maintenance and repair is needed for Alternative A to be consistent with Idaho Forest Practices Rules. The action alternative is consistent with this criterion. In addition to standard State BMPs, other soil and water conservation practices that are approved BMPs are built into the timber sale contract. Site-specific BMPs are specified and are listed in the BMP portion of this appendix. Soil and water conservation principles were used during alternative design to determine the location and types of treatments including which areas should be avoided or restored. The specified and designed measures surpass

those required by the State Forest Practices Act and are consistent with Forest Service standards.

31. Cooperate with the states to determine necessary instream flows for various uses.

    Instream flows are not an issue with any of the proposed projects. Therefore, this Standard is not applicable to any alternative.

32. Manage public water system plans for multiple uses by balancing present and future resources with public water supply needs.

    Streams not defined as public water systems, but used by individuals for such purposes, will be managed to standards established by the state's forest practices rules and/or the National Forests' BMPs or to the fisheries standards whichever is applicable Johnson Creek or West Johnson Creek are not defined as a public water system.

33. Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota.

    The existing biota will be maintained in first and second order streams through standard and site specific BMPs and the application of INFS standards and guidelines. Site Specific BMPs and applicable INFS standards and guidelines are listed and described in the BMP portion of this appendix.

34. It is the intent of this plan that models be used as a tool to approximate the effects of National Forest activities on water quality values.

All alternatives meet this standard. The WEPP model was used to predict water and sediment yield changes. Road drainage crossings were inventoried to assess erosional hazards and risks to aquatic ecosystems, using the *Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings* (Flanagan et al 1998). This method gathered information on road-stream crossings that included fill volumes, culvert sizes, erosional features, and other variables, then ranked each crossing for treatment (project file – aquatics section). A modified version of the R1/R4 fish and fish habitat inventory (Overton et al 1997) was conducted along Johnson Creek and West Fork Johnson Creek and some of their tributaries during the 2002 field season. Additional stream information was collected to determine stream channel types, cross sectional profiles, woody debris composition, and stream temperature. Existing and potential in-channel and stream-bank erosion sites were also documented with this survey.

# Appendix B
# Fisheries Management Direction and Guidelines

## Inland Native Fish Strategy (INFS) Standards and Guidelines

Only INFS standards and guidelines (USDA Forest Service 1995; A7-13) that apply to the range of alternatives for the Wrenco Loop Project are addressed here; those standard and guidelines that do not apply are in the INFS document located in the project file - fisheries. These INFS standards and guidelines are addressed with comments in italics as follows:

### Timber Management (A-7)

**TM-1**. Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs.

b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoid adverse effects on inland native fish.

*Using "Standard Widths Defining Interim RHCAs," no commercial timber harvest activities are proposed under the action alternatives within RHCAs in the project area.*

*Effectiveness*: *High. No commercial harvest is to occur within the RHCAs.*

### Roads Management (A-7-8)

**RF-1**. Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives.

*Some proposed road improvement activities will occur on private industry lands adjacent to National Forest lands and those activities have been coordinated with those listed above where applicable.*

*Effectiveness*: *High. This coordination is standard policy.*

**RF-2**. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by:

a. Completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas (RHCAs) within priority watersheds.

No construction of new roads, temporary roads, or landings is proposed within RHCAs in priority watersheds.

b. Minimizing road and landing locations in Riparian Habitat Conservation Areas.

New roads are proposed to cross RHCAs under the proposed action alternative, but their presence in the RHCAs would be minimized.

*Effectiveness*: *High.*

c. Initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

1. Road design criteria, elements, and standards that govern construction and reconstruction.

2. Road management objectives for each road.

3. Criteria that govern road operation, maintenance, and management.

4. Requirements for pre-, during-, and post-storm inspections and maintenance

5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives such as protection of the road surface.

6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control.

7. Mitigation plans for road failures.

*The interdisciplinary team (IDT) evaluated access and road improvement needs within the project area and completed a Roads Analysis Report with standards and management objectives (see the project file – roads section).*

*Effectiveness*: *Moderate.*

d. Avoiding sediment delivery to streams from the road surface.

1. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is unfeasible or unsafe.

*This standard is applied directly for the proposed roads.*

*Effectiveness*: *High. Roads would be constructed with this design.*

1. Route road drainage away from potentially unstable stream channels and hillslopes.

*Effectiveness:* *High. Improved road drainage would be part of the road package. Water would be less concentrated below existing roads than at present.*

d. Avoiding disruption of natural hydrologic flow paths.

*The roads would be designed in the proposed action to avoid disrupting the natural hydrologic flow.*

*Effectiveness: High. Avoiding disruption of the natural hydrologic flow would be part of the road package.*

e. Avoid sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.

*There are no priority watersheds in the project area.*

*Effectiveness: High. Since there are no priority watersheds in the project area, no material will be sidecast in priority watersheds.*

**RF-3.** Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation.

b. Prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.

c. Closing and stabilizing; or obliterating and stabilizing; roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds, and the ecological value of the riparian resources affected.

*The proposed road construction and maintenance originate from the above standards. The action alternatives would meet this standard.*

*Effectiveness: High. Existing roads are proposed for reconstruction with the Timber Sale Contract, so the likelihood that the projects would be completed is high.*

**RF-4.** Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bed load and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect priority watersheds from increased sedimentation. Base priority for upgrading on risks in priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

*The proposed road crossing improvements originate from the above standard. The action alternatives would meet this standard.*

*Effectiveness: High. Existing roads are proposed road construction would occur with the Timber Sale Contract, so the likelihood that the projects would be completed is high.*

**RF-5.** Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

*The only crossing of a fish-bearing stream is the West Fork of Johnson Creek crossing on FS Road 1023. This crossing would be sized so it would not be a migration barrier for fish.*

*Effectiveness*: *High. There are currently no crossings that are known fish barriers within the project area. The proposed road design would maintain fish passage.*

## Fires/Fuels Management (A-11)

**FM-1**. Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate detrimental conditions, or be damaging to, long-term ecosystem function or inland native fish.

**FM-2**. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.

**FM-3**. Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines that an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

**FM-4**. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.

*The proposed prescribed burn projects originate from the above standards. The proposed action would meet this standard.*

*Effectiveness*: *High. Planting of long-lived tree species to provide for large woody debris recruitment would follow prescribed burning within the RHCAs.*

**FM-5**. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland native fish whenever a wildfire or a prescribed fire burning out of prescription significantly damages Riparian Habitat Conservation Areas.

*The proposed fires/fuels management originate from the above standards. The action alternatives would meet this standard.*

*Effectiveness: Moderate to High. Prescribed fire in the project area is designed to meet these standards.*

General Riparian Area Management (A-12)

**RA-1**. Identify and cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

*This project would not adversely affect instream flows.*

**RA-2.** Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

Slashing of the understory may occur within RHCAs in order to accomplish burning and planting of long-lived species such as cedar, larch, and white pine.

**RA-3**. Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.

*By following the BMPs in the Sandpoint Noxious Weed FEIS, the proposed action would meet this standard.*

*Effectiveness: High. Standards would be met as required by the Sandpoint Noxious Weed EIS.*

**RA-4**. Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling with Riparian Habitat Conservation Areas unless there are no other alternatives. The Forest Service must approve refueling sites within a Riparian Habitat Conservation Area or Bureau of Land Management and have an approved spill containment plan.

*Effectiveness: High. This is a standard BMP that is part of the timber sale contract.*

**RA-5**. Locate water-drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

*Effectiveness: Moderate. This standard would be applied in the prescribed burn plans associated with the Wrenco Loop project. However, wildfire suppression is beyond the scope of this project and water drafting associated with such an emergency would be addressed as a separate issue.*

### Watershed and Habitat Restoration (A-12)

**WR-1**. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.

*Effectiveness: High. The proposed watershed restoration projects originate from the above standard. The proposed action would meet this standard.*

**WR-2.** Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other agreements to meet RMOs.

*Effectiveness: Moderate to High. Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project and is consistent with the recommendations in the Lake Pend Oreille Bull Trout Problem Assessment (PBTTAT 1998), the Lake Pend Oreille Bull Trout Conservation Plan-Final Draft (Resource Planning Unlimited 1999).*

### Fisheries and Wildlife Restoration (A-13)

**FW-1.** Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the Riparian Management Objectives.

*Effectiveness: High. Improvements to existing road drainage structures, road decommissioning and culvert removals are habitat enhancement actions that will be implemented in a manner that contributes to attainment of Riparian Management Objectives.*

**FW-4.** Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.

Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project. Using the INFS Standard Widths Defining Interim RHCAs for the project activities, habitat manipulation does not apply. Fish stocking, harvest and/or poaching are all regulated by State management guidelines.

*Effectiveness: High. Existing habitat would be preserved under this project.*

## State of Idaho Governor's Bull Trout Plan

The following describes a "step down" process from the Governor's Bull Trout Plan.

Governor's Bull Trout Plan (State of Idaho 1996):

- The mission of the plan is to "…maintain and/or restore complex interacting groups of bull trout populations throughout their native range in Idaho.
- The Plan created the Basin Advisory Groups, which oversee the Watershed Advisory Groups (WAG). The Technical Advisory Team's role is to assist the WAG with issues regarding the recovery of bull trout in each key watershed.

Lake Pend Oreille Key Watershed Problem Assessment (PBTTAT 1998)

- Johnson Creek was ranked as a Low Priority subwatershed for restoration because of a lack of records indicating historic or current use of the system by bull trout and the presence of manmade migration barriers near the mouth of Johnson Creek from road and railroad crossings.

# Appendix C
# Forest Plan Standards for Old Growth

### 10a. A definition for old growth is being developed by a Regional task Force and will be used by the forest when completed. As an interim guideline, stands classified as old growth should meet the definition given by Thomas (1979).

Forest plan standard 10a incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in: *Green, and others. 1992 (errata corrected 9/04). Old Growth Forest Types of the Northern Region. USDA, Forest Service, Northern Region*.

### 10b. Maintain at least 10 percent of the forested portion of the Idaho Panhandle National Forests as old growth.

The old growth definitions in *Green and others* are in two parts. First, there are tables of "Old Growth Type Characteristics". In these tables there are "minimum criteria" (minimum age, tree diameter, number of large trees, and basal area) and "associated characteristics" (ranges and probabilities of percent broken topped trees, decay, snags, diameter distribution, large down wood, and number of canopy layers). Second, pages 11 and 12 of *Green and others* explains how to use these tables. It's explained that: "minimum criteria in the 'tables of old growth type characteristics' are meant to be used as a screening device to select stands that may be suitable for management as old growth, and the associated characteristics are meant to be used as a guideline to evaluate initially selected stands." The "associated characteristics" are the means of values found in the data set evaluated in *Green and others*. There was so much variability in associated characteristics that *Green and others* did not find them useful even as a screening device for old growth. Therefore, *Green and others* warns that: "A stand should not be accepted or rejected as old growth simply on the basis of associated characteristics."

Speaking of the minimum criteria, *Green and others* further say: "Because of the great variation in old growth stand structures, no set of numbers can be relied upon to correctly classify every stand…Most stands that meet minimum criteria will be suitable old growth, but…some old growth may be overlooked. Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide." *Green and others* then goes on to provide some guidance for incorporation of landscape considerations, and a full range of resource values (including human values) in the final selection of lands to be managed as old growth. The overall message is that old growth cannot be absolutely defined in black and white by some specific set of numbers; professional consideration of a wide and complex variety of factors is necessary to make determinations for old growth allocation.

Using the guidance in *Green and others*, we have inventoried and identified old growth stands on the Idaho Panhandle National Forests. We record old growth status in the Forest Service Northern Region Timber Stand Management Record System (TSMRS) database, because there are database fields and codes dedicated to old growth. Over the years, there have been some changes in old growth code definitions in the Regional TSMRS database, and part of the objective of the comprehensive review we're in the midst of is to make sure that all our old growth stands are coded correctly in terms of the current definitions. Any database is simply an electronic box with pre-defined fields to store specific types of information. It is not possible to make meaningful sweeping general statements about the reliability of a widely used database. The reliability of any specific information item in any database depends upon the local effort devoted to gathering and maintaining that specific information item. In the last three years, the Idaho Panhandle National Forests has spent over $300,000 reviewing and updating our old growth information in TSMRS, and that effort is ongoing.

Our database allows us to track old growth in several categories, depending upon how it was identified in the inventory and how it is currently allocated. We separate our old growth into the "allocated" old growth stands that are specifically identified and "retained" to meet the 231,000-acre forest plan standard, and "additional" identified old growth that serves old growth ecological functions, even though it is not formally allocated for this purpose.

"Existing Old Growth" meets (and usually exceeds) Northern Region old growth minimum criteria at the stand level. The "Ancient Cedar" category is also part of our existing allocated old growth, but we track it separately because we want to take special note and care of these unique stands. "Ancient Cedar" stands contain some trees over five feet in diameter and generally over 500 years old; they far exceed minimum old growth criteria.

"Potential Old Growth" meets, or comes very close to meeting most old-growth stand minimum criteria, but is lacking somewhat in some criteria. However, it does contribute to old growth functions. The most common situation is that the "potential old growth" has more than enough large trees to meet old growth criteria, but some of the trees are not quite old enough. However, these are usually the largest and oldest trees we have in a given area, and with time can be expected to meet the age criteria as well. Some "potential old growth" is included in our old growth allocation because it is close to meeting the minimum criteria, it is the best that we have available in an area, and the distribution of old growth across the landscape is important. Other allocated "potential old growth" stands are small patches that contribute to the integrity of a larger block of allocated old growth, or serve as part of a corridor or as stepping stones, linking two larger old growth blocks. Larger old growth patches are generally more valuable as wildlife habitat, and linkages across the landscape are important. Allocated potential old growth contributes to the functional integrity of old growth at the landscape scale, and is managed as part of our old growth allocation. This is consistent with the direction in *Green and others (1992)* about the importance of using landscape ecology considerations, as well as individual stand attributes, in selecting land to be allocated as old growth (USDA Forest Service 2003a pp. 90 and 91).

Old growth totals are presented in table C-1. Forest Plan standards call for us to maintain 231,000 acres of old growth (10 percent of our forested acres). We have identified and allocated 275,200 acres (11.9 percent of forested acres) to be retained as old growth. We also have an additional 7,442 acres (0.3 percent of forested acres) of field verified unallocated old growth, which provides old-growth habitat for wildlife and serves other ecological functions. Not showing in the table below are an additional 6,665 acres that have been aerial-photo identified as possible old growth, but have not yet been field checked.

The Idaho Panhandle National Forests old growth allocation was distributed among the districts as documented in the Forest Supervisor's May 7, 1991 letter concerning the subject "Forest Plan Explanation: Implementing Old Growth Standards." The Sandpoint Ranger District was responsible for allocating 19,718 acres for old growth management.

Forest Plan monitoring for 2003 indicates that the allocated old growth for the Sandpoint Ranger District (Pend Oreille) is 24,700 acres.

None of the old growth acres listed above occur in the Wrenco Loop project area.

**Table C-1. Acres of old growth by river subbasin**

| Sub-Basin (River) | Allocated Existing Old Growth *(Codes 9, 10)* | Allocated Ancient Cedar *(Code 2)* | Allocated Potential Old Growth *(Code 11)* | Total Allocated Old Growth *(Codes 2, 9, 10, 11)* | Additional Field Verified Old Growth *(Code 12)* | Total All Old Growth *(Codes 2, 9, 10, 11, 12)* |
|---|---|---|---|---|---|---|
| St. Joe | 59,995 | 1,946 | 13,114 | **75,055** | 7,407 | **82,462** |
| Coeur d'Alene | 56,037 | 18 | 8,867 | **64,922** | 0 | **64,922** |
| Pend Oreille | 19,708 | 63 | 4,929 | **24,700** | 0 | **24,700** |
| Kootenai | 60,224 | 516 | 3,507 | **64,247** | 0 | **64,247** |
| Priest | 43,693 | 1,169 | 1,414 | **46,276** | 35 | **46,311** |
| **Forest Total** | **239,657** | **3,712** | **31,831** | **275,200** | **7,442** | **282,642** |

### 10c. Select and maintain at least five percent of the forested portion of those old growth units that have five percent or more of existing old growth.

### 10d. Existing old growth stands may be harvested when there is more than 5% in an old growth unit, and the Forest Total is more than 10%.

The Wrenco Loop project area is in old growth management unit (OGMU) 22. Allocated old growth in this OGMU includes 454 acres, which is 7.7 percent of the 5,890 acres of federal lands within OGMU 22. This meets the minimum five percent standard.

Since there is no old growth in the Wrenco Loop project area, neither the 5% minimum nor the 10% Forestwide standard would be affected by either of the alternatives (see map of OGMU #22 in Vegetation Project File).

### 10e. Old growth stand should reflect approximately the same habitat types series distribution as found on the Idaho Panhandle National Forests.

Forest Plan Standard 10e says: "Old growth stands should reflect approximately the same habitat type series distribution as found on the Idaho Panhandle National Forests." Table C-2 displays old-growth habitat type series distribution compared to the same distribution across all our inventoried acres.

As displayed in table C-2, old growth in the Idaho Panhandle National Forests does reflect approximately the habitat type series distribution of the forest. On 78.5 percent of the land the amount of old growth is proportional to, or more than proportional to the distribution of that habitat type series. Old growth distribution is less than proportional to habitat type series distribution only in the Douglas-fir and grand fir series, which occupy the driest 21.5 percent of the land. The dry habitat type group (all of the Douglas-fir and the dry end of the grand fir series) occupies approximately 10 percent of Idaho Panhandle National Forests land. The moist end of the grand fir series (which is still drier than the rest of the forest) covers another 11.5 percent of Idaho Panhandle National Forests land; it is often found at lower elevations and southerly aspects adjacent to the dry types, and is subject to significant moisture stress during drought years.

**Table C-2. Old growth habitat type series distribution**

| Habitat Type Series | % Inventoried IPNF Acres by Habitat Type Series | % of Allocated Old Growth by Habitat Type Series |
|---|---|---|
| Ponderosa Pine | < 0.1% | 0.0% |
| Douglas Fir | 6.8% | 2.5% |
| Grand Fir | 14.7% | 5.2% |
| Western Red Cedar | 16.1% | 18.6% |
| Western Hemlock | 37.7% | 40.0% |
| Subalpine Fir | 15.0% | 18.6% |
| Mountain Hemlock | 9.7% | 15.1% |
| Lodgepole Pine | < 0.1% | 0.0% |

The huge, severe 1910 burn and other big early 20th century fires, subsequent suppression of all low-severity fires, early 20th century timber cutting, root diseases, and bark beetles have all contributed to the low proportion of old growth in these two habitat-type series. Much of the old growth inventoried on these two habitat type series is currently dominated by Douglas-fir, which is at risk from bark beetles and root diseases. Where the moister, nonriparian grand fir habitat types are adjacent to dry sites, fires, root diseases, and bark beetles that strike the dry sites have a high probability of carrying over into adjacent Douglas-fir/grand fir stands. During drought years, grand fir growing on upland sites is at risk from *Scolytus* bark beetles. The discussion on pages 92 and 93 of the 2003 Forest Plan Monitoring Report explores the importance of active management in sustaining and increasing the proportion of old growth on dry habitat types (USDA Forest Service 2003a, pp. 92 and 93).

### 10f. One or more old-growth stands per old growth unit should be 300 acres or larger. Preferences should be given to a contiguous stand; however, the stand may be subdivided into stands of 100 acres or larger if the stands are within one mile. The remaining old growth management stands should be at least 25 acres in size. Preferred size is 80 plus acres.

Since there is no old growth in the Wrenco Loop project area, the size of old growth stands within the OGMU would not be affected by either of the alternatives.

### 10g. Roads should be planned to avoid old growth management stands to maintain unit size criteria.

Since there is no old growth in the project area, road construction would not affect the old growth acres.

### 10h. A long-term objective should be to minimize or exclude domestic grazing within old growth stands.

Activities proposed do not include domestic grazing allotments. There are currently no grazing allotments in the area. It is unlikely that grazing would occur in the project area. This standard would be met by both alternatives.

## 10i. Goals for lands to be managed as old growth within those lands suitable for timber production are identified in the management area prescriptions.

Table C-3 displays goals by management area, and what we have currently allocated for old growth. Only the four management areas have specific Forest Plan old growth goals. Current old growth allocations meet and far exceed these Forest Plan goals.

No stands of allocated old growth are proposed for harvest. All standards would be met by both alternatives in the Wrenco analysis area.

**Table C-3. Acres of allocated old growth compared to management area goal**

| Management Area | Acres to Maintain in Each Management Area | Allocated Old Growth Acres* |
|---|---|---|
| 1 | 25,000 | 106,178 |
| 2 | 6,000 | 21,996 |
| 3 | 400 | 1,920 |
| 4 | 4,000 | 13,903 |

*(USDA Forest Service 2003a, pp. 91 and 92).