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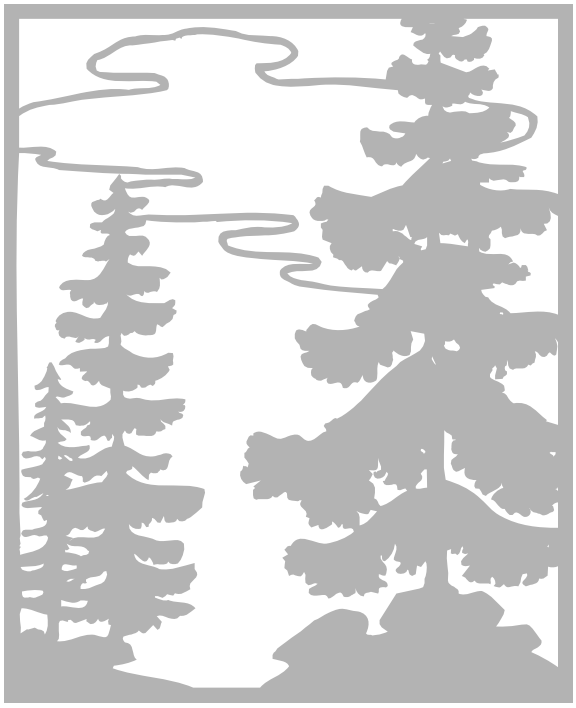
Mission Brush

Supplemental
Final Environmental Impact Statement



April 2006

Bonners Ferry Ranger District

Idaho Panhandle National Forests
Bonners Ferry Ranger District
Boundary County, Idaho

Mission Brush
Supplemental
Final Environmental Impact Statement

April 2006

Lead Agency:	USDA Forest Service
Responsible Official:	Ranotta McNair, Forest Supervisor Idaho Panhandle National Forests 3815 Schreiber Way Coeur d'Alene, ID 83814 208 765-7223
For Further Information Contact:	Doug Nishek, project leader Bonners Ferry Ranger District 6286 Main Street Bonners Ferry, ID 83805 (208) 267-5561

Abstract

The Mission Brush project proposes vegetation, wildlife habitat, recreation, and aquatic improvement treatments on National Forest lands in the Mission and Brush Creek watersheds of the Bonners Ferry Ranger District. The objectives of the project are to begin restoring forest health and wildlife habitat, improving water quality and overall aquatic habitat by reducing sediment and the risk of sediment reaching streams, and providing recreation opportunities that meet the varied desires of the public and the agency while reducing negative effects to the ecosystem.

The Mission Brush Final EIS (FEIS) and Record of Decision (ROD) were released to the public in May 2004 and legal notice of the decision was published in the newspaper of record (Spokesman Review) on June 1, 2004. Since then a court decision has further articulated the legal requirements concerning management of National Forest System lands on the Idaho Panhandle National Forests (*Lands Council v. Powell* 395 F.3d 1019 (2005)).

This supplemental EIS has been prepared to document and respond to the new case law, provide the results to the public, and assist the decision-maker in reaching a reasoned and informed decision.

Copies of this EIS are available in printed format or on compact disc (CD) from the Bonners Ferry Ranger District; it is also available on the Idaho Panhandle National Forests' Internet site at http://www.fs.fed.u/ipnf/eco/manage/nepa/index.html

Chapter 1 -- Purpose and Need for Action **1-1**

1.1 Mission Brush Assessment Area 1-1

1.2 The Purpose and Need for the Mission Brush Project 1-1
1.2-A. Vegetation 1-1
1.2-B. Aquatics 1-2
1.2-C. Wildlife Habitat 1-2
1.2-D. Recreation 1-2

1.3 Need for a Supplemental EIS 1-5

1.4 Overview of Ninth Circuit Court's Opinion and Supplemental Analysis 1-5
1.4-A. Cumulative Effects of Past Harvest Activities 1-5
1.4-B. Soils Analysis 1-5
1.4-C. Limitations of the WATSED Model 1-5
1.4-D. Accuracy of database used for old growth calculations 1-5
1.4-E. Data used for wildlife and fisheries analysis 1-6
1.4-F. Forest Plan Fry Emergence Standard 1-6

1.5 Overview of Scientific Findings - From Broad Scale to Site Specific 1-6
1.5-A. Interior Columbia Basin Ecosystem Management Project (ICBEMP) 1-6
1.5-B. Northern Region Overview 1-6
1.5-C. North Zone Geographic Assessment and Mission Brush Assessment Area 1-7
1.5-D. Vegetation - Historic Range of Variability 1-7
1.5-E. Aquatics 1-8
1.5-F. Wildlife 1-9
1.5-G. Recreation 1-9

1.6 Desired Future Conditions 1-9
1.6-A. Vegetation 1-9
1.6-B. Aquatics 1-11
B.1 Mission Creek and Brush Lake Watersheds 1-11
B.2 Hall Mountain 1-11
1.6-C. Wildlife 1-11
1.6-D. Recreation 1-11

1.7 Proposed Action 1-12
1.7-A. Scope of the Analysis 1-12
A.1 Past Activities and Events 1-12
A.2 Current Management and Ongoing Activities 1-12
A.3 Reasonably Foreseeable Activities 1-13
1.7-B. Policy Direction and Legal Framework 1-13
B.1 Federal Laws 1-13
B.2 Executive Orders 1-13
B.3 Forest Service Policies and Regulations 1-13

1.8 Decision to be Made 1-16

Chapter 1 -- Purpose and Need for Action

1.1 Mission Brush Assessment Area

The Mission Brush assessment area straddles the northern border of the Bonners Ferry Ranger District and extends into the Mission Creek drainage in Canada. The area is bordered by Rock Creek to the south and Miller Creek on the east. Hall, Mission, and Bethlehem Mountains are the prominent peaks in the area.

The assessment area encompasses the Mission and Brush Creek watersheds - totaling about 31,350 acres. Approximately 16,550 acres are National Forest lands on the Bonners Ferry Ranger District, 7490 acres are private land, and 7300 acres lie in Canada (Figure 1-1). Over 100 homes and ranches flank the project area on the eastern, western, and southern perimeters.

Ecosystems in and around the Mission Brush project area are diverse, ranging from valley bottom farmland to sub-alpine forested peaks. The project area is very important to the local economy because it contains the Brush Lake Campground, hiking trails, scenic vistas, big game hunting and fishing opportunities, timber products, huckleberries, and most of the area is accessible by vehicle.

Wildlife in the project area includes elk, white-tailed deer and mule deer, mountain goat, moose and black bear. The project area intersects designated habitat for the Canada Lynx. Effects of the proposed restoration activities in Lynx habitat are analyzed in detail in this EIS.

The Mission Brush EIS describes the current and desired future conditions of the ecosystems in this area. Key issues or alternative driving issues and concerns pertaining to management of the National Forest System lands were identified through internal discussions by resource specialists assigned to this project and the responsible officials, as well as with meetings and written comments received from the public and other governmental agencies. Ways to measure and describe potential changes, are shown as “Issue Indicators,” listed in Chapter 2.

The National Environmental Policy Act (40 CFR 1500-1508) directs the procedures for documenting analysis of proposed management activities. “The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. ... Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.” (40 CFR 1500(b) and (c))

1.2 The Purpose and Need for the Mission Brush Project

The purpose and need for entering the Mission Brush project area includes four primary considerations – vegetation, aquatics, wildlife habitat, and recreation.

1.2-A. Vegetation

Trend the vegetation composition, structure, and diversity of landscape patterns toward desired future conditions across the landscape by providing for tree species and stocking levels that resist insects, diseases, and stand-replacing wildfire(s). Improve landscape patterns by creating openings that more closely resemble those created by fires before active fire suppression.

These goals would be met through the following objectives:

- Reducing the number of trees per acre, and favoring the development of large diameter ponderosa pine and western larch.
- Returning the role of fire back into the ecosystem, giving priority to ponderosa pine stands with dry site old growth characteristics.
- Re-establishing western white pine as a significant component of its historic range.
- Treating stands near private lands to reduce the risk of stand-replacing wildfires in wildland / rural interface settings.
- Regenerating the “off-site” ponderosa pine plantations near Brush Lake.

- Protecting our investments in existing plantations and reducing sources of dwarf mistletoe infection within and adjacent to existing plantations.
- Reducing the high-risk lodgepole pine component in stands where this species is currently susceptible to mountain pine beetle infestations.

1.2-B. Aquatics

Maintain and improve the aquatic ecosystems (watershed and fisheries) in the Mission Creek and Brush Creek drainages through the following objectives:

- Restore hillslope hydrology where it has been substantially altered by road construction and other management activities.
- Reduce erosion and sediment delivery from road surfaces and ditches that are currently contributing sediment to Mission Creek, Brush Creek, and their tributaries.
- Maintain and improve aquatic habitat within the Mission Creek watershed by reducing existing and potential sediment risks from roads.
- Identify roads that need to be reconstructed and roads that can be decommissioned (permanently closed) or put into storage.

1.2-C. Wildlife Habitat

- Promote the long-term persistence and stability of wildlife habitat and biodiversity by trending toward an ecosystem composed of vegetation that provides a wide range of wildlife habitats.
- Improve the diversity of forest structures in the area, including larger patch sizes with less fragmentation. This would provide for wildlife, fish, and plant habitat diversity.

1.2-D. Recreation

Provide recreation facilities that are safe, meet universal accessibility requirements, meet future needs, retain the rustic nature of the area and improve the quality of the recreation site around Brush Lake.

- Rehabilitate the recreation facilities to restore the quality of the site, to meet universally accessible requirements, and to provide safe access along roadways and to site facilities.
- Design improvements to accommodate current use as well as expected increased future use with the intent of retaining the rustic character of the camping and picnic areas.
- Develop long-range management guidelines for all vegetation, including ground cover, shrubs, and trees. Primary concerns include public safety, scenery management, perpetuation of a healthy and beautiful forest, and overall enhancement of the recreation facility.
- Explore opportunities to increase lakeside trails, full range trails (ATV, motorcycle, stock, mountain bike, or hiking), and Watchable Wildlife trails.
- Maintain rustic and generally private opportunities for Dispersed recreation.
- Identify roads that will be closed to vehicle traffic and can be developed as trails for motorized use.
- Identify areas to be closed to motorized uses and managed for uses that are compatible with other resource concerns.

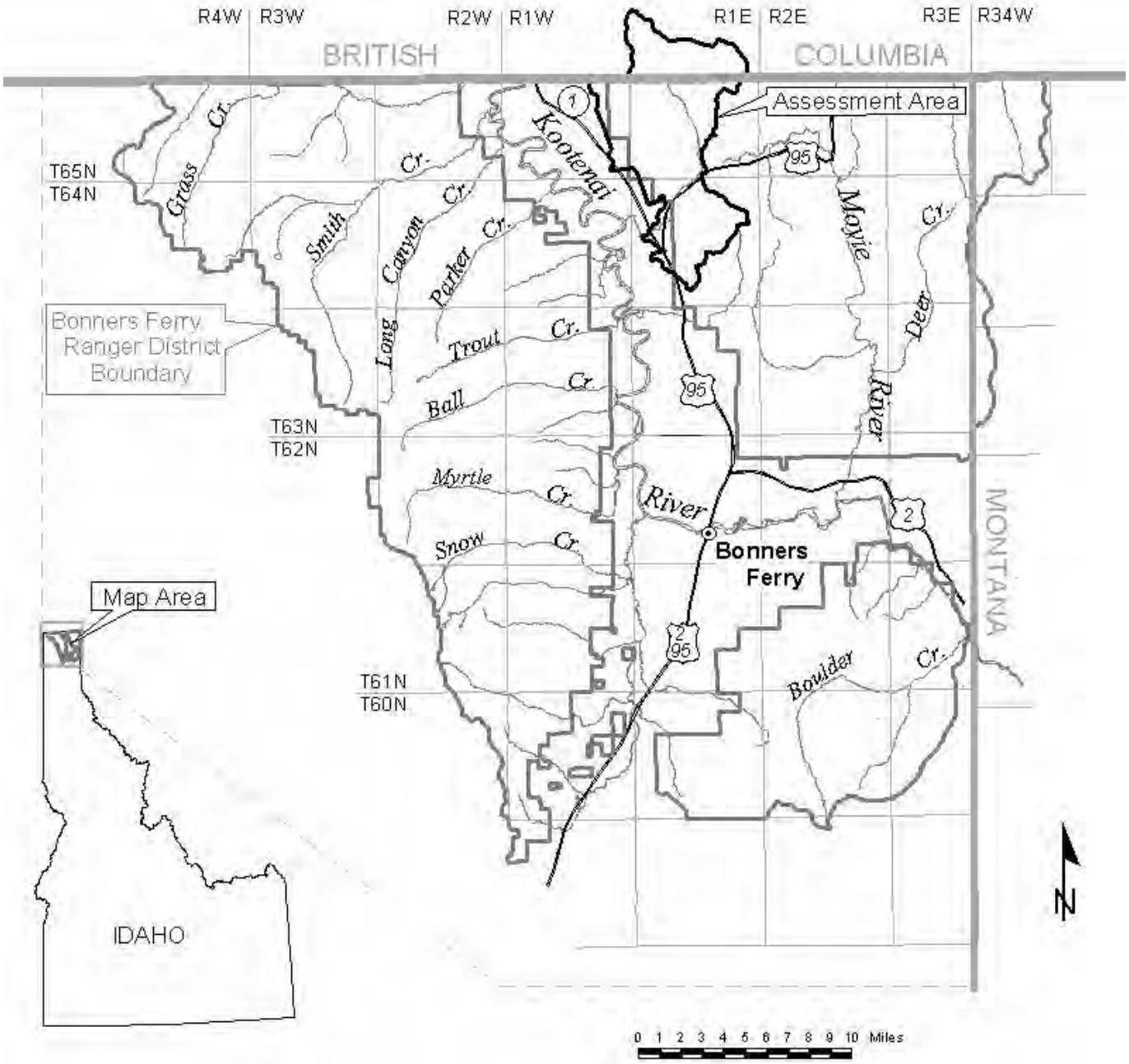


Figure 1-1. Mission Brush EIS Vicinity Map

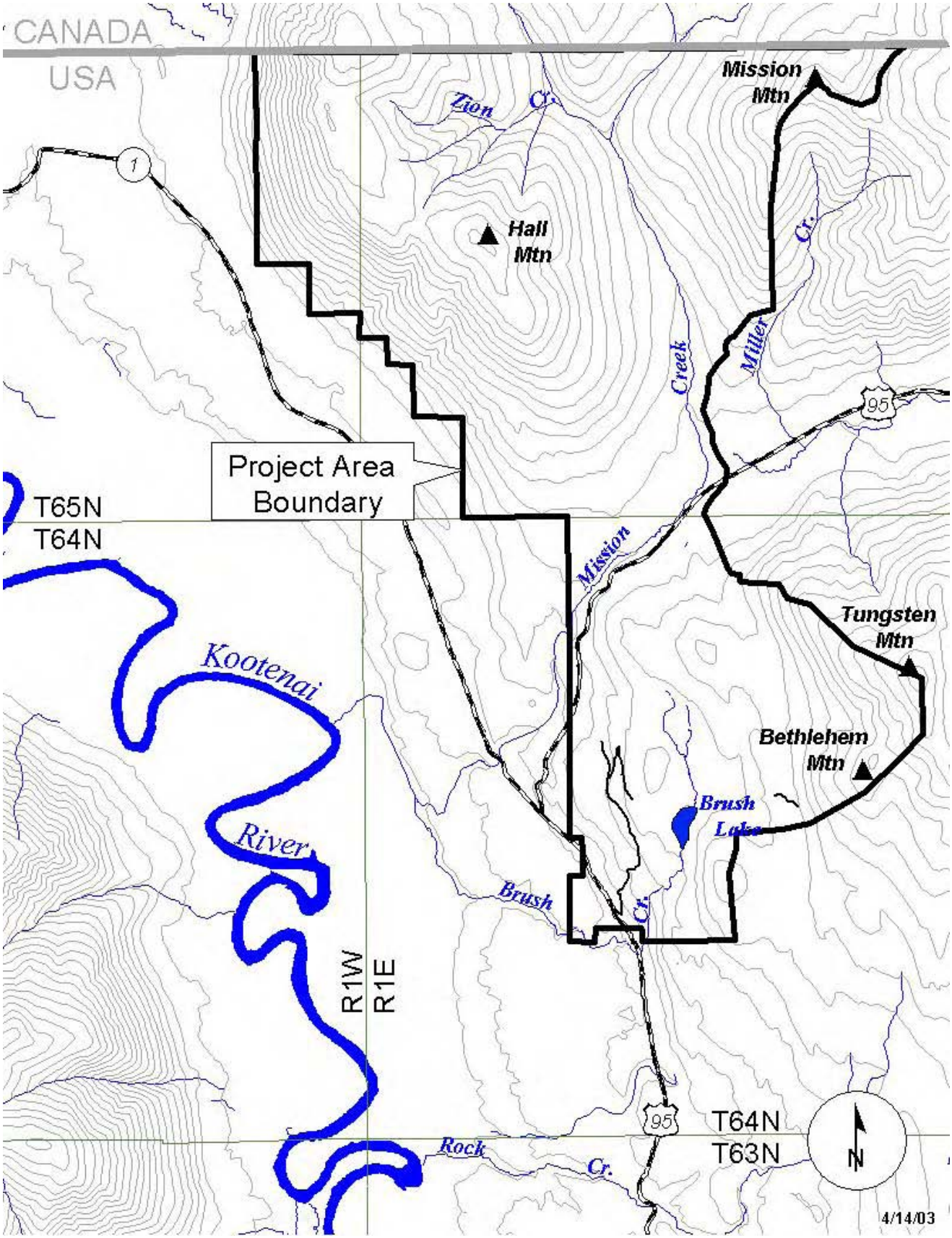


Figure 1-2. Mission Brush Project Area

1.3 Need for a Supplemental EIS

The Mission Brush Final EIS (FEIS) and Record of Decision (ROD) were released to the public in May 2004 and a legal notice of the decision was published in the newspaper of record (Spokesman Review) on June 1, 2004. The Record of Decision was appealed on July 15, 2004. Following review of the appeal, on August 30, 2004 the Appeal Deciding Officer upheld the decision with the following instruction, "I affirm the Forest Supervisor's decision to implement the Mission Brush project. …However, because of the recent 9th Circuit Opinion in Lands Council vs. Powell, I am directing the Forest to delay implementation of this project until further notice."

Lands Council. v. Powell[1] has further articulated the legal requirements concerning management of National Forest System lands on the Idaho Panhandle National Forests. This supplemental EIS documents and responds to the new case law, provide the results to the public, and assist the decision-maker in reaching a reasoned and informed decision in light of the new court decision.

This Supplemental EIS contains information addressing the case law from the Ninth Circuit's ruling. Discussions cover past timber harvests and associated activities in the project's cumulative effects area, the methodologies used for analysis of wildlife and fisheries, soil conditions, and stands of old growth trees. It also discloses changes since the release of the Final EIS and ROD that are pertinent to this project, such as the Regional Forester's October 28, 2004 update to the Northern Region's Sensitive wildlife species listings (changes from the previous list in 1999.)

The following format is being used to aid the public and the decision maker in finding the new/supplemental information that has been included in this EIS.

Two-column text for new information.
Single-column text for information from the 2004 FEIS.

1.4 Overview of Ninth Circuit Court's Opinion and Supplemental Analysis

The following is a brief overview of the Ninth Circuit Court's opinion and the supplemental analysis provided in the SFEIS.

1.4-A. Cumulative Effects of Past Harvest Activities

Past timber harvests need to be described in suitable detail (time, place, type and scale) including a sufficiently detailed explanation of the effects of different harvest methods in order to promote an informed assessment by the public and agency personnel[1].

1.4-B. Soils Analysis

The soils analysis was based entirely on the spreadsheet model with no on-site inspection or verification.[1]

1.4-C. Limitations of the WATSED Model

There was inadequate disclosure that the WATSED model is incomplete and shortcomings in the consideration of relevant variables were not disclosed. [1]

1.4-D. Accuracy of database used for old growth calculations

There is evidence that the Forest Service's main tool for old growth calculation, the timber stand database (TSMRS), was inaccurate. The data proffered is about fifteen years old, with inaccurate canopy closure estimates.[1]

[1]Direction from the Ninth Circuit Court Amended opinion *Lands Council v. Powell* 395 F.3d 1019 (2005)

1.4-E. Data used for wildlife and fisheries analysis

Regarding wildlife analysis, The timber stand management reporting system database (TSMRS) was inaccurate... record here shows that the proffered data is about fifteen years old, with inaccurate canopy closure estimates, and insufficient data on snags. ... This raised questions about the currency and accuracy of data.

Here the data about the habitat of westslope cutthroat trout was too outdated to carry the weight assigned to it, thereby preventing the Forest Service from making an accurate assessment of cumulative impacts on habitat and population of the westslope cutthroat trout. [2]

1.4-F. Forest Plan Fry Emergence Standard

Because the Inland Native Fish Strategy (INFS) standards and the Forest Plan fry emergence standard measure different variables, are triggered by different conditions, and have different remedies, applying both to any conceivable project presents no conflict.[2]

1.5 Overview of Scientific Findings - From Broad Scale to Site Specific

Information from a number of scientific assessments was used to arrive at the purpose and need for this project (goals, objectives and desired future conditions). Starting at the broad scale of the Columbia River Basin, general information about characteristics of the ecosystems in the basin were determined. More specific levels of information were derived from analyses at graduated scales -- from the river basin level, to a sub-basin level, to a watershed area level, and finally to a sub-watershed or project area level. General information from these assessments and how they relate to the Mission Brush assessment area are briefly described below.

1.5-A. Interior Columbia Basin Ecosystem Management Project (ICBEMP)

The ICBEMP Scientific Assessment evaluated the public lands administered by the USDA Forest Service and USDI Bureau of Land Management in a 63 million-acre area within Eastern Oregon, Eastern Washington, most of Idaho, and westernmost Montana. The Mission Brush project area lies within lands classified as "Forest Cluster 4" in the Scientific Assessment. These lands are characterized as heavily roaded, moist forest types with moderate to high hydrologic integrity and low forest, aquatic, and composite integrity (Quigley, Haynes and Graham 1996, pp. 115-116).

The Scientific Assessment findings show that within areas meeting the Forest Cluster 4 definition, the primary risks to ecological integrity are:
- Risks to late and old forest structures in managed areas,
- Forest compositions susceptible to insects, disease and fire, and
- Risks to hydrologic and aquatic systems from fire potential.

In the Assessment, the level below the Columbia River Basin scale was defined as "sub-basin." The Mission Brush project is located in the Kootenai River sub-basin, one of 164 sub-basins in the Columbia River Basin.

1.5-B. Northern Region Overview

The Northern Region Overview (USDA, 1998) focused on priorities for restoring ecosystem health and availability of recreation opportunities. The Overview considered and incorporated findings from the Interior Columbia River Basin (ICBEMP) and Northern Great Plains Assessments. The Northern Region Overview Summary explores this Region's situation with regards 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 sub region holds the greatest opportunity for vegetation treatments and

[2]Direction from the Ninth Circuit Court Amended opinion *Lands Council v. Powell* 395 F.3d 1019 (2005)

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 October 1998, p. 33).

1.5-C. North Zone Geographic Assessment and Mission Brush Assessment Area

The Idaho Panhandle National Forests (IPNF) has been assessing the ecological conditions across the North Zone, which is made up of the Pend Oreille Lake, Priest River, and Kootenai River sub-basins. The Kootenai River sub-basin is essentially the Bonners Ferry Ranger District. The Kootenai River sub-basin includes the Mission Creek and Brush Creek watersheds. According to the North Zone Geographic Assessment (NZGA, draft in progress) only 12% of the Kootenai River sub-basin is composed of dry forest types, which is why it is considered a valuable forest type in the area.

The Mission Brush assessment area provides some of the largest contiguous blocks of dry forest types on National Forest land within the Kootenai River sub-basin. In addition, the moist forest types that transition into these dry forests; provide the opportunity for much needed western white pine restoration.

1.5-D. Vegetation - Historic Range of Variability

From Morgan et al. 1994. The concept of historical range of variability in ecosystem structure or process is valuable in understanding and illustrating the dynamic nature of ecosystems; the processes that sustain and change ecosystems, especially disturbances; the current state of the system in relationship to the past; and the possible ranges of conditions that are feasible to maintain. Because ecosystems are structured hierarchically, historical range of variability must be characterized at multiple spatial scales and relevant time scales. Historical range of variability is a useful reference for determining a range of desired future conditions, and for establishing the limits of acceptable change for ecosystem components and processes.

To achieve an ecosystem management approach, and to determine potential actions in the assessment area, this analysis examines the past, present, and potential future ecosystem processes. Historic Range of Variability (HRV) is a reference condition from which ecological trends can be compared and contrasted. "HRV is not a goal, but a measure of ecosystem changes and trends," (Zack, 1999). From these comparisons of past and present conditions, the HRV for attributes in the ecosystem were determined. For example, stand structures and their species compositions can be estimated from the intensity and frequency of fires that burned through these stands.

The information on ecological trends is used to identify the magnitude in changes in the ecosystem, the implications of managing or not managing the forest, and the desired future conditions (goals) for the ecosystem processes in the Mission Brush project area.

The vegetative component of the North Zone Geographic Assessment defines parts of the Mission Brush project area as "Low Integrity/High Risk Landscapes." Findings that relate to the Mission Brush assessment area are as follows:

- These landscapes have changed the most from historic conditions due to major losses of long-lived seral species (ponderosa pine, western larch, and western white pine).
- These landscapes contain large areas of forest types with high probability of major successional change in the next few decades.
- Douglas-fir is at an age and stand density where combinations of root diseases and bark beetles begin to create high mortality.
- Dense and multi-storied stands of Douglas-fir or true firs dominate dry habitat types.
- Current forests are dominated by shade-tolerant, drought- and fire-intolerant species (grand fir, western redcedar, and western hemlock), and short-lived seral species (lodgepole pine and Douglas-fir).
- There is a growing risk of wildfire as a result of natural fuels accumulations.

The management recommendations that relate to the Mission Brush project area are specifically focused on the restoration of long-lived early seral species (ponderosa pine, larch, and western white pine). These recommendations include:

- Using regeneration harvest and prescribed fire to create openings that will favor development of long-lived early succession tree species, including blister rust-resistant western white pine.
- Using a variety of silvicultural methods (thinning and regeneration) and prescribed fire to sustain and favor long-lived early succession tree species where they are present.

Restoring long-lived early seral species would:

- Reduce the extent of drought- and fire-intolerant species (grand fir, hemlock, and cedar) on sites where they are not well adapted and are likely drought-stressed.
- Reduce the extent of short-lived early seral forest species (Douglas-fir and lodgepole pine) that are near the end of their pathological rotation age.
- Lower the risk of large, severe disturbances such as stand-replacement fires.

1.5-E. Aquatics

The aquatic component of the NZGA assigns a Watershed "Functioning" Condition rating for watersheds based on three categories: overall inherent sensitivity, watershed disturbance and riparian disturbance. Overall sensitivity of the drainage evaluates the percentage of sensitive landtypes and acres in the rain-on-snow zone compared to the total acres of the drainage. Watershed disturbance is derived from evaluating the combination of upland road densities, hydrologic openings and percentage disturbance on sensitive landtypes. Riparian disturbance is based on miles of encroaching roads, riparian road density, and stream crossing frequency.

Watershed Functioning Conditions are defined as follows:

Properly functioning: Within the scope of this assessment, a properly functioning watershed system is one that is exhibiting dynamic equilibrium characteristics and whose streams are operating and responding appropriately under their current environment. These systems can absorb and respond to disturbances under which they have evolved within their natural range of variability. Typically, parts of these systems, or the system as a whole, can move toward a more stable condition over time following a disturbance (or a series of disturbances) within a certain time period.

As a system, these watersheds are not high priority for large scale watershed restoration actions (although local, site-specific improvements may be beneficial.)

Functioning-at-risk (FAR): A watershed system that is functioning-at-risk is one that is essentially still properly functioning. They continue to have good physical, hydrologic and water quality integrity. However, present or ongoing adverse disturbances are likely to compromise watershed function and initiate a trend toward "not properly functioning" if the disturbances are not modified or corrected. A FAR status may also be assigned where the apparent watershed status is uncertain due to the complexity of the watershed system and the historic and current watershed disturbances.

These systems are the first priority for large scale watershed system restoration and improvement programs. Such programs will often produce effective and timely responses in the near future.

Not properly functioning (NPF): Watershed systems that are not properly functioning exhibit rapid adverse trends and are not fully supporting beneficial uses. These systems are in need of large-scale restoration. These watersheds are usually second priority due to limited availability of resources, uncertain technology, and the long time period expected for positive responses.

The Mission Creek Watershed is considered "functioning-at-risk" due to its high overall inherent sensitivity and its moderate riparian and watershed disturbance. Past logging and road construction activities have occurred throughout the drainage, including in Canada and on private lands. Restoration efforts should include identifying and decommissioning roads that are no longer needed and pose a threat to hillslope hydrology and aquatic habitat. Road improvements should also be considered, especially for roads within Riparian Habitat Conservation Areas.

The Brush Creek Watershed is also considered "functioning-at-risk" due to the moderate disturbance that has occurred within the watershed. Most of the improvement needs identified within this planning area recommend road improvements on highly-used roads and to decommission roads no longer used or needed.

The Hall Mountain analysis area was included in aquatics analysis for this project; however, it was not assessed as a distinct watershed since does not have a definable drainage boundary. Therefore, a functioning condition summary was not assigned to this specific area. (See Figure 3-32 "Watershed Effects Analysis Boundaries" in Chapter 3 for the locations of the analysis area and project cumulative effects area for Aquatics.)

1.5-F. Wildlife

Wildlife habitat in the Mission Brush assessment area is directly linked to the vegetation trends discussed in the ICBEMP and NZGA. Decades of active fire suppression, the inadvertent introduction of white pine blister rust, and past harvest practices and associated road construction have led to a number of troubling wildlife habitat trends presently taking place within the Mission Brush assessment area. These include the loss of old-growth habitat, the loss of open-grown dry-site forest stands, increased understory congestion within mature stands, decline in acres of forest openings and sapling/pole-sized stands, general reduction of large snags and woody debris, and a proliferation of open forest roads.

Wildlife species that depend upon drier site ponderosa pine type old growth forest structures have suffered a decline in habitat. Species that depend upon large residual trees in younger stands, large snags, or large down wood have likewise lost habitat. On the other hand, wildlife species that are favored by dense multi-storied stands of medium sized trees have gained habitat.

1.5-G. Recreation

The Brush Lake campground and day use area is about 40 years old. They do not adequately accommodate current or predicted future use and do not provide universally accessible restrooms or other facilities. Improvements are needed to provide safe access along roadways and to site facilities, and to accommodate current use as well as expected increased future use. All improvements should be made with the intent of retaining the rustic character of the camping/picnic area.

1.6 Desired Future Conditions

1.6-A. Vegetation

The desired future conditions for the vegetation component are to:

- Create stand conditions that favor development of seral tree species (larch, ponderosa pine and white pine) and reverse the trend toward dominance by mid- and late-successional species (Douglas-fir, grand fir, cedar, and hemlock). This can be done by creating forest openings that promote the establishment of the favored species, or by maintaining the dominance of these species where they are currently a significant component.

- Reduce the number of densely stocked stands in the project area. While these types of stands certainly existed historically, they now dominate the landscape to the point where large open-grown stands of ponderosa pine, larch, and white pine are virtually non-existent.

In the long-term, restoration of the historic structure and composition of our forests would result in forests that are more likely to be sustainable over time. In turn, the conditions would tend to maintain the hydrologic function in the aquatic ecosystems, improve forest health and have an increased resilience to disturbance, as well as providing habitat for a variety of plants and animals that evolved with these ecological systems.

Euro-American settlement of the Inland West has altered forest and woodland landscapes, species composition, disturbance regimes, and resource conditions. Public concern over the loss of selected species and unique habitats (e.g., old-growth) has caused us to neglect the more pervasive problem of declining ecosystem health.

Population explosions of trees, exotic weed species, insects, diseases, and humans are stressing natural systems. In particular, fire exclusion, grazing, and timber harvest have created anomalous ecosystem structures, landscape patterns, and disturbance regimes that are not consistent with the evolutionary history of the indigenous biota. Continuation of historical trends of climate change, modified atmospheric chemistry, tree density increases, and catastrophic disturbances seems certain. However, ecosystem management strategies including the initiation of management experiments can facilitate the adaptation of both

social and ecological systems to these anticipated changes. A fairly narrow window of opportunity-perhaps 15-30 years-exists for land managers to implement ecological restoration treatments (Covington et al. 1994)

Figure 1-3. Picture of Unhealthy Stand Conditions

Figure 1-3, taken in the project area, illustrates the ladder fuels and hazardous fuel loadings found in and around the mature and dry site old growth stands. These stand conditions are typically drought stressed and therefore predisposed to insect, disease outbreaks or stand replacement fire (See Vegetation section Chapter 3 and 4).

Figure 1-4. Desired Future Condition for dry site forest ecosystem

The picture in Figure 1-4 was taken approximately 12 miles south of the Mission Brush area in a stand that used to have conditions similar to those in Figure 1-3. The vegetation was treated with a commercial thin and underburn about 15 years ago with a follow-up thinning and underburning in 2002. The stand now shows the general desired characteristics of our drier forest types. With fewer trees per acre in a more open structure, it is currently and will continue to be much more resilient to disturbances such as drought, insect and disease epidemics, and the threat of stand replacement fire.

Morgan et al. (1994), stated that when ecosystems are outside their historical range of variability, changes may occur dramatically and rapidly. An investment of money, energy, or human effort may be required to counter processes that would

change the desired state of the ecosystem. In other words, ecosystems outside their historical range would be much more susceptible to catastrophic changes from fires and insects and diseases. Consequently, the cumulative effects of no action in these dry forest types would result in fires that are more costly and difficult to manage when ecosystem structure and composition are outside their historical range.

1.6-B. Aquatics

B.1 Mission Creek and Brush Lake Watersheds

The Desired Future Condition for these drainages is to begin the improvement trend for watershed recovery to a properly functioning condition (PFC). Watersheds that are considered PFC are operating and responding appropriately in their current environment. These systems can absorb and respond to disturbances that they have evolved under within their historic range. This would be accomplished by the following measures:

- Improving roads that are contributing sediment;
- Decommissioning roads that are contributing or pose a great risk of contributing sediment; and,
- Any additional aquatic habitat improvement projects within both drainages.

B.2 Hall Mountain

The Desired Future Conditions for the Hall Mountain area is to reduce the short and long-term risk of mass failure potential. The west slopes of Hall Mountain are naturally prone to mass failures, especially where historic logging and mining roads and skid trails could concentrate water and trigger these events. These have occurred on private and on Natural Forest Systems Lands. Risk would be reduced by the following measure:

- Restoring natural hillslope processes through road decommissioning to prevent further mass failure potentials.

1.6-C. Wildlife

Past actions and other disturbances have laid the foundation for today's forest vegetation and are depicted / accounted for in the baseline condition descriptions in Chapter 3. This is especially true for habitat suitability analyses, which characterizes the changes in vegetation (succession) from past disturbances.

Cumulative effects discussions for alternatives (see Chapter 4) include these past actions in combination with other relevant present, ongoing, and reasonably foreseeable actions, regardless of the source (past, present and reasonably foreseeable actions are described in Chapter 1 and Appendix A). The appropriate scale or geographic bounds for cumulative effects analysis relates to an area that would be affected by the proposed action or reasonable alternative. This area is referred to as the cumulative effects analysis area and may vary between resources. Determining this area for wildlife depends upon a species' relative home range size in relation to its available habitat, topographic features that influence how species move and utilize their home range (e.g. watershed boundaries), and boundaries that represent the point of diminishing potential effects.

In the absence of disturbance, vegetation follows a gradual and more predictable sequence of change called succession. As vegetation moves through each stage of succession, the composition of wildlife species shifts accordingly. Wildlife species have distinctive successional strategies. Some species are more suited to the early stages of forest succession where grasses, forbs and shrubs dominate the site, while others are better suited for the later stages of forest development (e.g. old growth). Other species are more generalists and have adapted to a wide array of vegetation patterns.

The Desired Future Condition for wildlife in the Mission Brush area is to provide a diversity of forest structures in the area, including larger patch sizes with less fragmentation. This will provide for wildlife habitat diversity. The project area contains stands that are relatively similar in size and age, and therefore, not providing a wide range of wildlife habitats.

1.6-D. Recreation

The desired future condition for Recreation in the project area includes the following:

- "Off-site" ponderosa pine trees near Brush Lake will be removed and replanted with native species.
- Road access to Brush Lake will be improved and will include informational and regulatory signing.
- Toilets and pathways will be universally accessible.
- Roads, trails, and pathways within the Brush Lake area will be evaluated to provide a greater range of recreation uses.
- Area closures will be considered to prevent cross-country ATV and motorcycle use while allowing trail access for activities such as berry picking, watching wildlife or hunting.

1.7 Proposed Action

The management activities that were initially proposed across the Mission and Brush Creek drainages were modified after additional interdisciplinary discussions and field trips in the assessment area. The modified Proposed Action is identified as Alternative 2.

The specific activities included in Alternative 2 are described in Chapter 2 "Description of Alternatives." More information on the first proposal (Alternative 5) is located in the Chapter 2 section "Alternatives Not Analyzed in Further Detail."

The proposal for management using Alt 2 in the Mission Brush project area includes vegetation restoration treatments in 57 Units, totaling approximately 4000 acres. To begin restoration and the trend toward desired future conditions, we are proposing silvicultural treatments that include thinning, regeneration, sanitation, and salvage harvesting. Harvest systems would include tractor, skyline, and helicopter. Fuels (slash) would be treated using prescribed fire and mechanical piling.

Silvicultural treatments for each stand were chosen for their ability to meet the stated purpose and need. The focus of each treatment is based on the desired quality of each treatment area after management rather than the quantity or quality of products removed from each area. In fact, some treatments would not remove forest products.

The proposed action includes reopening approximately three miles of existing, but overgrown and nearly impassable roads. About two miles of new temporary roads would be constructed. For purposes of the effects analysis, the entire five miles were considered as construction of temporary roads that will be decommissioned following project activities. No new system (permanent) road construction is proposed. For the locations of these temporary roads, see Figure 2-4 in Chapter 2. Approximately 39 miles of current system roads will be improved and 13 miles of currently undriveable roads will be decommissioned as illustrated in Figures 2-9 and 2-10.

1.7-A. Scope of the Analysis

The Mission Brush EIS analyzes the environmental effects of the proposed action within the assessment area and, when appropriate, the surrounding landscape. It is the site-specific documentation for Forest Plan implementation. The proposed action provides the basis of a management strategy and development of alternative strategies for the project area based upon the specific Forest-wide goals, objectives, and standards of the Forest Plan; interdisciplinary team discussions, public involvement, legal framework and agency policies and regulations.

Three types of actions are considered in determining the scope of analysis, as follows:

- Connected Actions that will occur as a direct result of any action alternative.
- Similar Actions are activities of a similar nature, timing, or geography that took place in the past or are predicted to take place in the near future.
- Cumulative Actions are the past, present, and reasonably foreseeable actions that may have cumulative effects when considered along with the Proposed Action.

For detailed information concerning Connected, Similar, and Cumulative actions, see Chapter 4.

A.1 Past Activities and Events

Past activities that have contributed to the current baseline conditions in the project area today, and may be included in the cumulative effects analysis, include the list of items in section A-2. It is important to keep in mind that the cumulative effects analysis areas for the various resources are not always identical. For instance, an aquatics environment analysis might be based on a watershed boundary while the sensitive plants analysis is tied to a particular set of habitat types and topographic features.

A.2 Current Management and Ongoing Activities

Even if no activities were being proposed under the Mission Brush project, certain management would continue in the area because of past decisions and current land management policies. Such activities that may be considered as appropriate in the cumulative effects analysis include the following items:

- Personal use firewood gathering consisting of salvage of individual dead trees by the public under a Firewood Permit system.
- Hunting for both big game and small game under regulations of the State of Idaho Department of Fish and Game.

- Maintenance of helispots used for wildfire suppression activities and on occasion to facilitate other types of work such as trail maintenance.
- Various types of recreation including hiking, motorized recreation on designated trails, horseback riding, fishing, camping, driving, berry picking, snowmobiling, and cross country skiing.
- Activities on private lands within the assessment area, such as continued use of agricultural lands, residential development, forest lands management, and mining claim activities. Mining claims are established for American Girl, Bethlehem, and Montgomery mine (presently considered the only active claim.)
- County road maintenance.
- Standard levels of maintenance on Forest Service roads and trails.
- Suppression of human-caused fire starts and wildfires under jurisdiction of the U.S. Forest Service or State of Idaho Department of Lands.
- Vegetation treatments and other activities that were previously analyzed in the Rock Bottom EA and Decision Notice, including the Rock Pine and Harebrush Timber Sales.

A.3 Reasonably Foreseeable Activities

The following reasonably foreseeable actions and management are considered in the cumulative effects analyses in Chapter 4, as appropriate for each resource analyzed in this EIS. The cumulative effects area for each resource is described in Chapter 4.

- Other restoration projects - noxious weeds monitoring and treatment, native seeding and timber stand improvement (tree thinning and pruning in plantations).
- Timber harvest on private lands and within the Canadian portion of Mission Creek watershed
- Development of a Forest Service seed orchard, approximately 15 acres in size, within proposed treatment Unit 134 on the eastern side of Hall Mountain.
- Underburning of dry site old growth stands to maintain old growth characteristics (details in Chapter 3).
- The Northern Prairie Environmental Assessment.

1.7-B. Policy Direction and Legal Framework

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 in the project file.

B.1 Federal Laws

The National Environmental Policy Act (NEPA) (1970)
The Clean Water Act (1948) and amendments (1972)
The Clean Air Act (1955)
The National Forests Management Act (1976)

B.2 Executive Orders

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

B.3 Forest Service Policies and Regulations

a) Natural Resource Agenda

On March 2, 1998, former Forest Service Chief Mike Dombeck announced the Forest Service Natural Resource Agenda. The Agenda provides a focus for the Forest Service, and identifies specific areas where there will be added emphasis. The four key areas identified are: 1) Watershed Health and Restoration; 2) Sustainable Forest Ecosystem Management; 3) Forest Roads; and 4) Recreation.

This proposal and the additional action alternatives are consistent with the Agenda.

- Watershed health and restoration would be addressed through road maintenance and by decommissioning unneeded roads or putting into storage roads intended for potential future uses. Any constructed temporary roads would be decommissioned or stored after access is no longer needed in order to mitigate any potential effects from sediment and water yield.

- Sustainable forest ecosystem management would be addressed by converting stands to desired, long-lived species, which are less susceptible to disease, and by improving growth and productivity of those species where they exist. Thereby, reducing potential fire severity and the continuing mortality of insect and disease infested stands.
- Recreation would be addressed by managing existing and future recreation opportunities in a way that protects the natural resources in the Mission Brush project area.

b) National Fire Plan

"Operating principles directed by the Chief of the Forest Service in implementing this include: firefighting readiness, prevention through education, rehabilitation, hazardous fuel reduction, restoration, collaborative stewardship, monitoring, jobs, and applied research and technology" (from Protecting People and Sustaining Resources in Fire-Adapted Ecosystems: A Cohesive Strategy, October 2000 pgs.11-12).

The restoration portion of this strategy states, "Restore healthy, diverse, and resilient ecological systems to minimize uncharacteristically intense fires on a priority watershed basis. Methods will include removal of excessive vegetation and dead fuels through thinning, prescribed fire, and other treatment methods."

The Mission Brush project is consistent with the National Fire Plan direction to manage and reduce overly dense forest vegetation through development of actions which are designed to restore resilient ecosystems and that will sustain the resources through time.

c) Final Rule – Administration of the Forest Development Transportation System

In January 2001, the Forest Service Manual, 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 de-emphasized the development of forest road systems and added a requirement for science-based roads analysis. The intent of the revision is "to help ensure that additions to the National Forest network of roads are those deemed essential for resource management and use; that, construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; and finally, that unneeded roads are decommissioned and restoration of ecological processes are initiated," (36 CFR Part 212).

An interim directive issued in December 2001 established that all road management decisions signed after January 12, 2002 must be informed with a "roads analysis" (Interim Directive 7710-2001-3, project file). The Final Rule set forth that if a Forest level roads analysis has not been completed, the Responsible Official 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 Roads Analysis conducted for the project area is included in the project file.

d) Forest Plan Direction

The IPNF Land and Resource Management Plan (Forest Plan) provides direction for all resource management programs and resource activities on the IPNF. 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 embodies the provisions of the National Forest Management Act (NFMA) of 1976 and its implementation regulations, as well as those of other guiding documents (see "Legal Framework" section).

Specific Forest Plan goals (USDA 1987, p. II-1 & II-2) 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 (USDA 1987, 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 [through fire] 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.

Forest Service Handbook (FSH) 2409.17 Interim Directive No.1 states, "Harvest cutting is done to carry out the intent of the Forest Plan. The objective of harvest cutting is two fold:

- Develop and maintain desired forest conditions over time, and
- Utilize the timber resource.

These objectives are not mutually exclusive. Both must be considered when applying a harvest cutting method. Specific silvicultural operations can be used to create the desired stand structures and manipulate biomass accumulations within each stand. These operations include:

- Control of tree density and species composition;
- Salvage of dead and dying trees to reduce the amount of carbon on the site - and reduce the potential for unplanned fires and reburn of areas in subsequent years;
- Site preparation to reduce undesired fuel, soil, or vegetation conditions; and competition control to encourage targeted species and avoid excesses or non-targeted species;
- Productivity enhancement through fertilization, which may also increase tree resistance to insects and diseases;
- Genetic management for trees, shrubs, and herbs to develop races which are resistant to introduced pests (Oliver et al. 1994).

Management Areas and Riparian Habitat Conservation Areas

The Forest Plan designated Management Areas (MAs) to guide the management of National Forest lands within the IPNF. They are described in detail in the Forest Plan on pages III-1 through III-87. Each MA provides a combination of activities, practices, and uses appropriate to the management goals and objectives of that specific management area.

Summaries of the Management Area Goals specific to the proposed action are as follows:

- Management Area 1 (66% of the project area) consists of lands designated for timber production.
- Management Area 4 (10% of the project area) consists of lands designated for timber production and to provide sufficient forage for projected big game populations.
- Management Area 9 (23% of the project area) consists of areas of non-forest lands, lands not capable of producing industrial products, lands physically unsuited for timber production, and lands capable of timber production but isolated by the above type lands or non-public ownership.
- Management Area 16 (1% of the project area) areas near stream courses and springs, important for aquatic habitat, recreation values and moist site old growth (RHCAs).
- Management Area 17 (less than 1% of the project area) existing and proposed developed recreation sites.

Recreation guidelines for the Management Areas are as follows:

- Management Area 1- Provide a diversity of recreational opportunities with an emphasis on full range (motorized and non-motorized) access.
- Management Area 4 - Provide dispersed recreational opportunities where motorized use is generally restricted to designated route.
- Management Area 9 - Lower emphasis on a road-related recreational experience and more emphasis on a trail or backcountry type of experience.
- Management Area 16 – includes the important fisheries streams on the IPNF; receives the highest concentrated recreation use on the Forest with most existing campground and undeveloped campsites within or adjacent to the MA16 areas. Can be appropriate for either developed or dispersed recreation management.
- Management Area 17 - Appropriate for developed recreation. (Campgrounds, picnic areas, interpretive displays, etc.) Use can be moderate to high and should emphasize full accessibility. Trails within the facility will generally be non-motorized and fully accessible. This MA covers less than 1% of the project area.

Riparian Habitat Conservation Areas (RHCAs) were developed for the Inland Native Fish Strategy, which amended the Forest Plan in 1995. These RHCAs are defined as, "portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. ... [they] include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems," (Inland Native Fish Strategy, page A-4.)

The Mission Brush project area is comprised of lands in Management Areas and Riparian Habitat Conservation Areas.

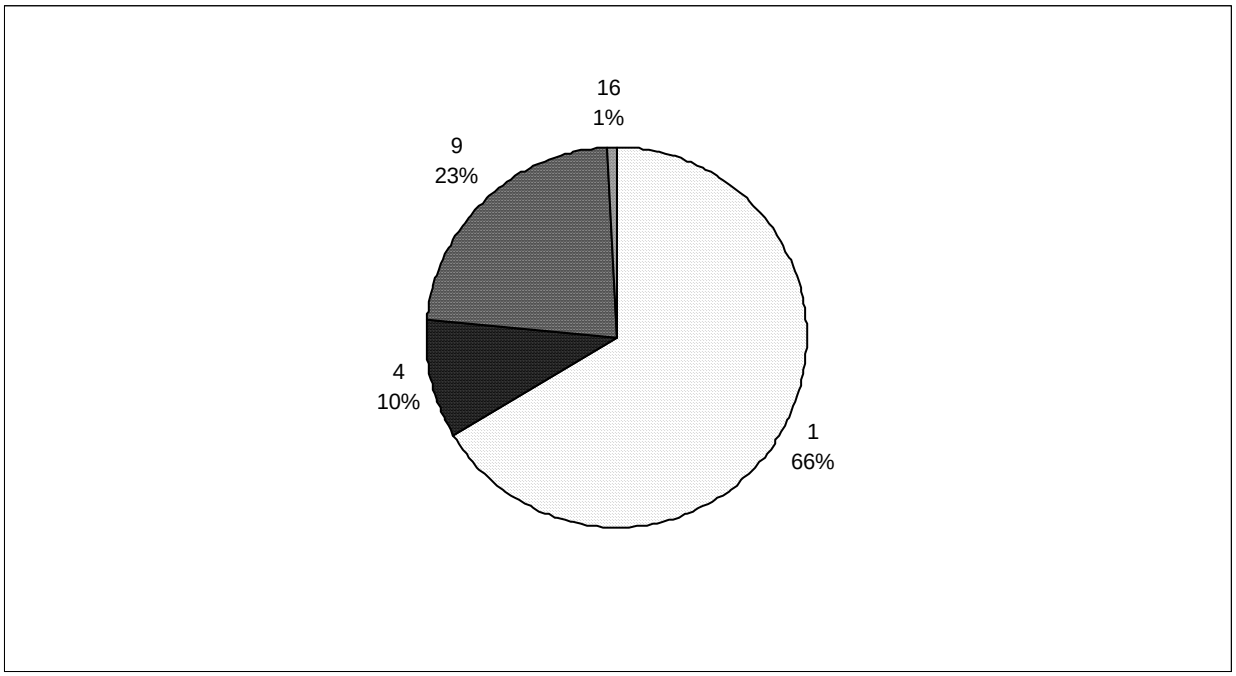


Figure 1-5. Mission Brush Project Area MA Designations

MA17 is not shown in the above chart since it composes less than 1% of the area.

1.8 Decision to be Made

This environmental analysis is not a decision document. The EIS discloses the environmental consequences of proceeding with the proposed action or any of the alternatives. The Responsible Official (Forest Supervisor) will select an alternative based on the information in this document, on public comments, on 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.

The decision to be made involves the selection of an alternative. If an action alternative is chosen, the decision will include:

- When proposed activities could begin and whether there are any timing restrictions.
- What type of restoration treatments would occur and where.
- What type of fuels treatment would occur and where.
- Which elements of the Transportation Plan, including road improvements, would be implemented, and when.
- Associated activities that would take place, such as monitoring and mitigation measures.
- Priorities for other opportunities that have been identified, including precommercial thinning and watershed restoration activities such as road decommissioning.

Chapter 2 - Proposed Action and Alternatives **1**
2.1 Introduction and Format *1*
2.1-A. Past Harvest Activities 2-1
2.1-B. Soils 1
B.1 Analysis Methodology 1
B.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis 1
B.3 Changes between the 2004 FEIS/ROD and the SFEIS 2-2
2.1-C. WATSED Model Limitations 2
C.1 Supplemental information 2
C.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis 2
C.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS 2
C.4 WATSED Use on the IPNF 2
C.5 WATSED Validation Monitoring 3
2.1-D. Old Growth Analysis 3
D.1 Supplemental Analysis 3
D.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis 3
D.3 Changes between the 2004 FEIS/ROD and the SFEIS 4
2.1-E. Data for Wildlife and Fisheries Analysis 4
E.1 Supplemental Analysis 4
E.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis 4
E.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS 5
2.1-F. Fry Emergence 5
F.1 Supplemental analysis 5
F.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis 5
F.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS 5
2.2 Public Involvement *2-6*
A.1 Project Background 2-6
A.2 Public Involvement Efforts Prior to Release of 2004 FEIS/ROD 2-6
A.3 Public Involvement Following Release of the 2004 FEIS and ROD 2-7
2.3 Alternative Driving Issues *2-7*
2.3-A. Issues and Indicators 2-7
2.4 Other Resource Concerns *2-12*
2.4-A. Changes Between the 2004 FEIS/ROD and Supplemental FEIS 2-12
2.4-B. Concerns Identified for the 2004 FEIS/ROD 2-12
2.5 Alternatives Considered but Eliminated from Further Study *2-13*
Changes Between the 2004 FEIS/ROD and Supplemental FEIS 2-13
Alternatives Eliminated From Further Study 2-13
2.6 Alternatives – Changes Between 2004 & 2006 *2-14*
2.7 Alternatives Considered in Detail *2-15*
2.7-A. Alternative 1 - No Action 2-15
2.7-B. Alternative 2 – Modified Proposed Action 2-16
2.7-C. Alternative 3 2-29
2.7-D. Alternative 4 2-35
2.8 Common Features, Required Design Criteria, and Estimated Effectiveness for All Action Alternatives *2-42*
A.1 Items included through standard timber sale contract clauses. 2-42
A.2 Criteria not included in timber sale and road construction contracts. 2-45
A.3 Watershed and Fisheries Features 2-48
A.4 Wildlife Habitat Features (protection or mitigation features) 2-50
A.5 Recreation Features (protection or mitigation features) 2-52
2.9 Monitoring *2-53*
2.9-A. IPNF Forest Plan Monitoring 2-54
Project Effectiveness Monitoring 2-57
2.10 Other Restoration Projects and Opportunities *2-57*
2.11 Comparison of Alternatives: *2-58*

List of Tables

Table 2-1 Principal (Alternative Driving) Issues and Indicators: Forest Vegetation 2-8
Table 2-2 Alternative Driving Principal Issues and Indicators: Watershed and Fisheries 2-8
Table 2-3 Alternative Driving Principal Issues and Indicators: Wildlife 2-9
Table 2-4 Species Analyzed in Detail (see Chapter 4) 2-10
Table 2-5 Species Not Analyzed in Detail (see Appendices A and B) 2-11
Table 2-6 Issues and Issue Indicators: Recreation 2-12
Table 2-7 Alternative 2 Restoration Treatments 2-24
Table 2-8 Alternative 2 – Silvicultural Treatment Summary 2-26
Table 2-9 Alternative 3 Restoration Treatments 2-32
Table 2-10 Silvicultural Treatment Summary – Alternative 3 2-33
Table 2-11 Alternative 4 Restoration Treatments 2-38
Table 2-12 Silvicultural Treatment Summary – Alternative 4 2-39
Table 2-13 Summary and Comparison of Vegetation, Fuels and Road Treatments 2-58
Table 2-14 Proposed Road Treatments -- Mission Creek and Hall Mtn areas 2-59
Table 2-15 Proposed Road Treatments -- Brush Lake Area 2-59
Table 2-16 Comparison of Alternatives by Resource Issues 2-62

List of Figures

Figure 2-1. Changes to Units 62 and 63 2-15
Figure 2-2. Brush Lake Facilities Upgrades 2-17
Figure 2-3. Proposed Recreation Area Designations 2-18
Figure 2-4. Brush Lake Area ATV Trail Network 2-19
Figure 2-5. Alternative 2 2-23
Figure 2-6. Alternative 3 2-31
Figure 2-7. Alternative 4 2-37
Figure 2-8. Road System – Mission Cr and Hall Mtn Areas 2-60
Figure 2-9. Road System -- Brush Lake Area 2-61

Chapter 2 - Proposed Action and Alternatives

2.1 Introduction and Format

This chapter discusses alternative-driving issues and lists other issues that were analyzed, but did not warrant the development of separate alternatives. It also describes and compares the alternatives considered in detail and briefly discusses three other alternatives that were considered, but eliminated from further study. The desired condition, purpose and need statements, and management area objectives in conjunction with the issues outlined in this chapter, provide the framework for alternative development.

This chapter has been updated to provide additional information related to the Ninth Circuit amended opinion in Lands Council vs. Powell (*Lands Council v. Powell* 395 F.3d 1019 (2005)) regarding specific resources in the Mission Brush project area; and the changes between the 2004 Final EIS and this Supplemental Final EIS.

The following format is being used to aid the public and the decision maker in finding the new/supplemental information that has been included in this EIS.

- Two-column text for new information.
- Single-column text for information from the 2004 FEIS.

Analysis & Changes Between the Final EIS & Supplemental Final EIS

Discussions of items 2.1-A through 2.1-F on the following pages are the key points from the Ninth Circuit's ruling on the Iron Honey project (Ninth Circuit Court amended opinion *Lands Council v. Powell* 395 F.3d 1019 (2005)) located in the Coeur d'Alene River drainage of the Idaho Panhandle National Forests.

2.1-A. Past Harvest Activities

The 2004 FEIS (pgs 3-9 through 3-11) contained a discussion of the types, times, locations, and scale of harvest on National Forest Systems lands as well as an overview of activities on adjacent private lands. A listing of National Forest timber sales by name, year(s), acres of harvest and type of treatment was included.

This Supplemental FEIS provides additional information regarding past activities on federal and private lands See Appendix A for a listing of activities.

The direct, indirect and cumulative effects of past activities are discussed by resource topic in Chapters 3 and 4.

2.1-B. Soils

B.1 Analysis Methodology

Soils analysis should not rely solely on spreadsheet models and database information for analysis of current conditions and probable effects. Information should be verified by field inspections of the soils and on-site verifications of the modeling results.

The supplemental review of these activities did not change the existing condition disclosures or determinations of effects for the resources.

B.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

The soils analysis for the Mission Brush FEIS did not rely solely on models or database information. All areas proposed for timber harvest were inspected on the ground following the techniques outlined in the Region 1 Soil Quality Standards. As stated in the FEIS, with the exception of Unit 16, all units are within the Region 1 soil standards. The FEIS specified measures that will be taken to rehabilitate the compacted areas in Unit 16 and move them toward a net improvement in soil quality (SFEIS, section 2.8 item A.1-j.)

B.3 Changes between the 2004 FEIS/ROD and the SFEIS

The soil resource was not identified during scoping as an alternative-driving issue for the Mission Brush project. The soil resource is included in Chapters 3 and 4, and Appendix A.

The information describes the analysis process, existing conditions and environmental consequences of the alternatives, including cumulative effects.

2.1-C. WATSED Model Limitations

C.1 Supplemental information

The discussion of analysis methodologies needs to include appropriate discussion of the limitations of the computer-generated WATSED model.

C.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

The Methodology section in Chapter 3 Aquatics (2004 FEIS) explicitly explained the limitations of the models used for analysis within the project area. It also explained other methodologies and references used to assist in the analysis.

The WATSED model was used to measure anticipated sediment and water yield modifications in the Mission Creek watershed. The watershed was divided into the following subwatersheds: West Fork of Mission Creek, East Fork of Mission Creek, Zion Creek, main stem of Mission Creek, and Lower Mission Creek.

The existing water yields and peak flows, and sediment yield were discussed on pages 3-46 through 3-49 and 3-52 of the 2004 FEIS; predicted effects were discussed on pages 4-34 through 4-46.

The FEIS *Watershed Description and Characterization* discussion (2004 FEIS, pgs 3-38 through 3-39) explained that the analysis area was subdivided into manageable watershed units for analysis. Three main areas were delineated based on 6th and 7th level watershed boundaries and the unique geologic and hydrologic characteristics of the area. These will be referred to as the Mission Creek watershed, the Hall Mountain area, and the Brush Lake area (see Figure 3-31, 2004 FEIS pg 3-39).

The discussion of potential effects in the Mission Creek watershed focused on the Lower Mission and Main Mission sub-watersheds (the two areas of greatest concern for potential sediment and water yield increases due to the sensitivity of the area). Modeling these two areas together presented a worse case scenario. WATSED modeling results of the other sub-watersheds were less than or equal to the results for these sub-watersheds and are documented in the project file. (2004 FEIS, pg 4-36).

The *cumulative effects analysis area* was delineated as the combination of the Brush Lake area, West Hall Mtn area, and Mission Creek watershed (2004 FEIS, pg 4-43).

C.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS

Further clarification of the appropriate uses and known limitations of the model are provided to help the public and the decision maker better understand this model and how it is used in the overall aquatics analysis for this project. This information is summarized here, with more detailed explanation in Chapters 3 and 4.

C.4 WATSED Use on the IPNF

The watershed response model, WATSED, used on the IPNF <u>is</u> designed to:
- Address the <u>cumulative</u> effects of timber harvest operations, roads, and fire.
- Account for drought or flood years and rain-on-snow events when those phenomenon are part of the long-term climatic record for a region.

It <u>does not</u> attempt to analyze the effects of :
Grazing or mining (other than vegetation removal and road construction), or other non-forest practices.

It <u>does not</u> attempt to simulate
- Individual or episodic storm events, drought or flood years, or

- The event-based response to individual events, including "rain-on-snow" events.

WATSED was designed to objectively compare relative differences between alternatives in terms of changes in trend, risks, and regimen; rather than to predict precise sediment and water yields that might occur as a result of stochastic events or non-forest related actions.

C.5 WATSED Validation Monitoring

The most recent WATSED Validation Monitoring was conducted for the 1999 and 2003 Forest Plan Monitoring and Evaluation Reports. Data gathered from three validation-monitoring watersheds (Halsey Creek and Big Elk Creek on the Coeur d'Alene River Ranger District and Long Canyon Creek on the Bonners Ferry Ranger District) has been analyzed for the purpose of comparing assessments and calculations to the WATSED sediment prediction model. The 2003 report updated the 1999 report and included information on these streams for the following years: Halsey Creek, 1984 through 2003; Big Creek from 1988 through 2003; and Long Canyon from 1985 through 2003.

The 1999 report concluded, "The findings from the three sets of comparisons indicate that the WATSED measured responses in terms of the three watersheds are within a reasonable range. They also suggest that natural sediment loads, both measured and predicted are close, with the outstanding exception of Halsey Creek. In two cases, the recovery relationships for predicted suspended loads appear to be higher than expected or measured." (IPNF Monitoring and Evaluation Report for 1999, pg 33)

The 2003 report stated, "In Halsey and Big Elk Creeks, substantial differences between estimated sediment delivered from the WATSED model and measured total sediment yields continue to be evident. The divergence could be related to over-estimations by WATSED, or from sampling error related to inadequate timing or frequency of bedload measurements in these watersheds. The pattern of consistent overestimates in both watersheds suggests a systematic error may be in place. These will be investigated so that either the sampling techniques or the model calibration can be adjusted for more consistent results." (IPNF Monitoring and Evaluation Report for 2003, page 41)

In Long Canyon Creek, the WATSED estimates are much closer to the measured values for sediment, peak flows, and duration of runoff. The stream flow estimates from WATSED and measured flows are consistent with each other. (IPNF Monitoring and Evaluation Report for 2003, pgs 41, 44)

2.1-D. Old Growth Analysis

D.1 Supplemental Analysis

The timber stand database (TSMRS) should not be the only source of information for old growth calculations and conclusions. Field visits should be used to verify or update database information and verify the old growth analysis and compliance with Forest Plan standards.

The Ninth Circuit Court's decision on the Coeur d'Alene River Ranger District's Iron Honey project (*Lands Council v. Powell*, 395 F.3d 1015-1046 (9th Cir. 2005)), also raised questions about the currency and accuracy of data.

Since the Iron Honey decision, the Bonners Ferry Ranger District has undertaken an extensive review of all the old growth stands in the Mission Brush project area.

D.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

The 1987 IPNF Forest Plan Standard 10a incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in Green and others, 1992 corrected 02/2005.

Forest Plan Standard 10b calls for maintaining "10% of the forested portion of the Idaho Panhandle National Forests as old growth". The forest plan identified 2,310,000-forested acres on the Idaho Panhandle National Forests. Therefore, the forest plan standard requires maintaining 231,000 acres of old growth on the forest.

For distribution purposes, the Forest Plan directs ranger districts to select and maintain at least 5% of the forested portion of those old-growth management units (OGMUs) that have 5% or more old growth.

The Mission Brush project area is located within OGMU 19 and 20.

Forest Inventory Data now available. The IPNF is currently using two independent tools to inventory and

monitor old growth at the Forest-wide scale: 1) Forest Inventory and Analysis (FIA) data and 2) IPNF stand level inventory, with old growth status recorded in TSMRS database. These two independent inventories use significantly different sample designs, and are administered and carried out by different people. Additionally, the district conducted a comprehensive old growth stand review at the project scale in OGMUs 19 and 20.

Information regarding the IPNF's forest wide and project scale old growth inventory can be found in Chapters 3 and 4 of the SFEIS.

D.3 Changes between the 2004 FEIS/ROD and the SFEIS

The alternatives included in the Mission Brush FEIS contained prescriptions that would be used to increase the overall quality and integrity of dry site old growth stands, by removing ladder fuels from below and around the large old relic trees to lower the risk of stand-replacing crown fires in the future. Periodic underburning every 5 to 10 years as appropriate would be used to maintain the numerous old growth stand attributes.

No entry into moist site (cedar-hemlock) or cool-moist (subalpine fir) old growth is proposed.

The Supplemental EIS documents and discloses the review of the district's old growth allocation in the Mission Brush project area. Based on the review none of the alternatives or their prescriptions were changed because there is more old growth allocated than required and the intent of actions in old growth are to improve the overall quality and integrity of dry site old growth stands.

2.1-E. Data for Wildlife and Fisheries Analysis

E.1 Supplemental Analysis

The 9th Circuit Court ruled that westslope cutthroat trout habitat data that was used in the Iron Honey project on the Coeur d'Alene River Ranger District was too outdated to carry the weight assigned to it, thereby preventing the Forest Service from making an accurate assessment of cumulative impacts on habitat and population of the westslope cutthroat trout.

E.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

Time is not the biggest factor in determining whether habitat data is stale; disturbance is. For example, if a habitat survey was completed in a stable B channel 15 years ago and no disturbance of consequence has affected the stream, the data would not be stale or inaccurate. However, if a flood, debris torrent, stand-replacing fire, or some other disturbance has occurred (including chronic disturbances), the data needs to be re-evaluated.

The fisheries habitat conditions and results of fisheries surveys are documented in sections 3.7-E and 4-.5-c.1 item c and 4.5-D.4. Creel census surveys (2003) indicate the cutthroat population in Mission Creek is stable, which correlates with presence / absence surveys taken in 1997. In summary, there have been no disturbances that have negatively affected the cutthroat habitat in Mission creek fishery since 1997 (project file). In summary, westslope cutthroat trout are known to inhabit Mission Creek and have been stocked into Brush Lake over the last decade.

Currently, bull trout are not known to inhabit Mission and Brush Creeks. Torrent sculpin inhabit large streams, and most white sturgeon are found only in the Kootenai River, but a few have been located in larger tributary streams. Burbot prefer lakes or large rivers. The cumulative effects to fisheries are described in section 4.5-D.

The FEIS analysis of cumulative effects included the realignment of U.S. Highway 95 and past, present and future timber sales on both National Forest System lands and private lands.

The 2004 FEIS discussed mass failures that occurred in the Hall Mountain area during the winter of 1997 (2004 FEIS, pg 3-46). However, because the mass failures are not in the Brush or Mission Creek watersheds and they are not near perennial streams, there is no linkage to any habitat for the fish species listed previously. The event would not have affected stream conditions for fisheries.

The realignment of U.S. Highway 95 (Figure 4-13, section 4-3.h) was included in the WATSED analysis and discussion of WATSED results. By use of timing restrictions, onsite direction and Best Management Practices, sediment delivery to occupied fish habitat would be minimized (see section 2.8).

Cumulative effects to fisheries are shown to be consistent with the Forest Plan, Endangered Species Act, National

Forests Management Act, Clean Water Act, Idaho Forest Practices Act, Executive Order 12962 regarding aquatic systems and recreational fisheries, and the State of Idaho Governor's Bull Trout Plan (section 4.6-D.8).

E.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS

The alternatives included in the Mission Brush FEIS contain features and design criteria (section 2.8) that would be used to avoid, or to the fullest extent possible, minimize the potential for adverse impacts to the resources, including wildlife and fisheries. These items did not change between the 2004 documents and this Supplemental FEIS.

Fisheries - Past fisheries surveys, Idaho Department of Fish and Game (IDFG) stocking records, and records of interviews with IDFG personnel were reviewed for timeliness and relevance to current conditions. This review of the district's fisheries data did not change either the existing condition or determination of effects as stated in the 2004 FEIS (2004 FEIS, pgs 3-52 through 3-54, 4-48 through 4-50).

Wildlife - Wildlife analysis utilizes vegetation data in determination of existing habitat conditions and effects to species. The review of the district's old growth allocation in the Mission Brush project area did not change any of the alternatives or their prescriptions included in the FEIS. Thus, the existing condition and effects determinations for wildlife did not change from what was described in the 2004 FEIS (2004 FEIS, pgs 4-52 through 4-89).

Since the 2004 FEIS and ROD were released, there have been two updates to wildlife listings that are pertinent to this project This Supplement responds to threatened and endangered species information released by the U.S. Fish & Wildlife Service (USFWS) in March 2005 and to information concerning R-1 sensitive species released by the Regional Forester in October 2004.

2.1-F. Fry Emergence

F.1 Supplemental analysis

The 9th Circuit Court held that because the Inland Native Fish Strategy (INFS) standards and the Forest Plan fry emergence standard measure different variables, are triggered by different conditions, and have different remedies, applying both to any conceivable project presents no conflict.

F.2 Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

The 1987 Land and Resource Management Plan (Forest Plan) for the Idaho Panhandle National Forests used fry emergence as one standard to help meet objectives of maintaining and improving fish habitat capacities in order to achieve cooperative goals with the state Fish and Game department and comply with state water quality standards. Appendix I of the Forest Plan described the Fishery/Watershed Analysis to be used on IPNF site-specific projects.

F.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS

After release of the 2004 FEIS/ROD and the Supplemental FEIS, the Idaho Panhandle National Forests amended the Forest Plan to remove objectives, standards, and monitoring requirements pertaining to fish fry emergence.

On June 2, 2005, the Forest Supervisor signed a Decision Notice and Finding of No Significant Impact that amended the Forest Plan (IPNF 2005. Fry Emergence Amendment Decision, 70 pages.) The amendment modifies or removes objectives, standards, and monitoring requirements pertaining to fry emergence success.

The amendment was implemented for the following reasons:

Fry emergence objectives, standards and monitoring requirements in the Forest Plan did not contribute as well as INFISH objectives, standards, guidelines, and monitoring direction towards meeting the goals of providing sufficient habitat in support of maintaining diverse and viable populations of fish species across the forest.

In addition, because of the limited application of the fry emergence models and their unreliability, and the inability to determine fry emergence success in the field due to high variability affected by multiple natural and human-caused factors, the Forest Service was not able to state with any degree of certainty whether measures of fry emergence success were accurate or precise.

2.2 Public Involvement

A.1 Project Background

The first public notice of proposed management activities in this area was made in 1997 for a project identified as Mission Round Prairie Environmental Assessment (EA). At that time, the Forest Service was assessing the conditions and proposing treatments in a larger area that included Round Prairie Creek, Gillon Creek, and Hellroaring Creek watersheds, as well as the Mission and Brush Creek drainages. In late 2002, the decision was made to center this project on the Mission and Brush Creek areas -- watersheds identified as high priority through the initial Mission Round Prairie assessment. The division of the project into two proposals, known as Mission Brush and Northern Prairie, was included in the January 2003 Schedule of Proposed Actions. Based on scoping and changes in Agency direction the Forest Service believes an EIS is the appropriate level of documentation for Mission Brush. The Notice of Intent to prepare an Environmental Impact Statement was published in the Federal Register on March 3, 2003.

A.2 Public Involvement Efforts Prior to Release of 2004 FEIS/ROD

During the early project assessment, a Public Involvement Plan was developed by the District Ranger, Project Leader, and Interdisciplinary Team. Notice of the proposal was initiated by the IPNFs' Quarterly Schedule of Proposed Actions in February 1997; the Schedule was sent to approximately 350 contacts on the IPNF mailing list. In July 1997, a more detailed scoping letter outlining general existing conditions, plans for the transportation system, and the proposed treatments, and acres planned for treatment was released. The letter went to adjacent landowners (within a 1 to 2-mile radius of the project area boundary) individuals, organizations, and government entities on the district's contact lists; approximately 126 letters were sent. The public was asked to provide comments on the proposal.

About 25 people attended an Open House conducted by the Interdisciplinary Team at the local Mount Hall Elementary School on September 8, 1997. The Open House was announced by direct mailings to 126 contacts, and an article in the local newspaper. Discussions focused on the NEPA analysis process, vegetation management, visual/scenic characteristics, fire ecology and prescribed fire management, wildlife, and forest hydrology. Following the written information and the Open House the district received 41 requests to remain on the contact list for future mailings, and 42 letters, visits and phone calls with comments about the project.

Local landowners requested several visits to their properties to discuss their particular concerns and possible effects to their land. Other contacts were made regarding special use permits for access, water transmission lines, etc. In the fall of 1997, a public field trip was held and a biologist from the Idaho Department of Fish & Game visited the project area with IDT members. The District Ranger attended a meeting of the Moyie River Property Owners Association (some of the adjacent landowners) on October 10, 1997.

A project update letter and request for comments was mailed on November 4, 2001. A follow-up Open House was held December 3, 2001 at the Mount Hall School; approximately 15 people attended. An additional 13 requests to be on the mailing list and 13 sets of comments were received.

Following release of the Notice of Intent to prepare an EIS (March 2003), one additional comment was received from a person who had not provided any earlier comments.

The Mission Brush project file contains the public letters, records of phone calls and visits to the area, notes from the Open Houses, mailing lists, news articles, Schedule of Proposed Actions, Public Involvement Plan and other documentation of the outreach and discussions held with members of the public.

A.3 Public Involvement Following Release of the 2004 FEIS and ROD

Chapter 1 (page 1-5) describes the need for the Supplemental FEIS for the Mission Brush project. A Notice of Intent to prepare a Supplemental EIS was published in the Federal Register on April 22, 2005. On April 29, 2005 approximately 75 copies of the Supplemental Draft EIS were mailed to interested members of the public, state and local agencies, as well as the required distribution to the Environmental Protection Agency and Department of Interior. The Federal Register published the Notice of Availability of the SDEIS on May 6, 2005. The legal notice of the availability appeared in the newspaper of record on May 9, 2005. In accordance with 36 CFR 215.5 the comment period ended June 20, 2005.

The substantive comments and the agency's responses are included in Appendix F. Comments on the Supplemental DEIS were received from the following entities:
- Charlotte Morris, Bonners Ferry, Idaho;
- U.S. Environmental Protection Agency, Region 10, Seattle, Washington;
- Idaho Conservation League, based in Boise, Idaho;
- U.S. Department of the Interior - Office of the Secretary, Portland, Oregon; and
- The Ecology Center, Inc. based in Missoula, Montana (also on behalf of the Lands Council, based in Spokane, Washington; Selkirk Conservation Alliance, based in Priest River, Idaho; and Kootenai Environmental Alliance, based in Coeur d'Alene, Idaho.)

2.3 Alternative Driving Issues

This section describes the alternative-driving issues that were used to formulate alternatives and to meet all or portions of the Purpose and Need. These issues, identified through public involvement and the scoping process, contain both internal and external concerns. Public scoping and involvement are described above. The issues discussed in this chapter were used to develop the action alternatives. Other resource concerns listed in this chapter were treated by changing the design of the alternatives, or by avoiding areas or certain types of activities. These concerns did not warrant development of a separate alternative. These Other Resource Concerns are listed below in Section 2.4 and discussed in Appendix A.

2.3-A. Issues and Indicators

a) Forest Vegetation

A short definition of a healthy forested ecosystem is, "a forest that retains the capacity to maintain structure and organization over time (Harvey et al 1994)." This simply means that if we can maintain our forests in conditions that existed historically (pre-fire suppression), they would tend to be healthier.

The North Zone Geographic Assessment (NZGA, draft in progress) defines parts the Mission Brush project area as "Low Integrity/High Risk Landscapes." These landscapes have changed the most across the North Zone from historic conditions due to major losses of long-lived seral species (ponderosa pine, western larch, and western white pine). These landscapes are the most heavily altered from historic conditions and contain the greatest need and opportunity for large-scale forest vegetation restoration.

In the Mission Brush project area, the most significant changes have occurred in dry forest types. Prior to the 20th century, many stands in these forest types were burned frequently by low- or mixed- severity fire; occasional stand-replacing fire occurred as well. Where fires occurred at relatively short intervals (less than 25 years), they were mostly non-lethal. All-aged structures were produced by non-lethal fire regimes, and even-age structures were produced by fire regimes with a combination of non-lethal, patchy, and severe fire (Smith and Fischer 1997). On similar stands in western Montana, fires at mean intervals of less than 50 years account for the presence of old growth ponderosa pine (Arno and others 1995). Based on field reconnaissance the average fire return interval for the lower elevations in the Mission Brush project area was estimated at 15 years, with a range of 10 to 35 years (Grant, 1998). On moist forest types, western white pine has been replaced by grand fir, western red cedar, and western hemlock, species that are more tolerant of shade, and less tolerant of drought and fire.

The issue indicators in Table 2-1 were used to evaluate direct, indirect, and cumulative effects of different vegetation management alternatives.

Table 2-1 Principal (Alternative Driving) Issues and Indicators: Forest Vegetation

Principal Issue	Principal Issue Indicators
Forest Composition	Acres trended towards restoration of long-lived seral species; i.e., ponderosa pine, western larch and western white pine. In particular, restoration of ponderosa pine in dry forest types is a primary concern.
Forest Structure	Acres trended towards restoration of historic forest structures. Dense stands of immature Douglas-fir and grand fir now dominate the landscape. Historically, open-grown stands of large-diameter ponderosa pine, western larch, and white pine were a much more significant component of these forests than they are currently. Increase in the size of forest openings compared to historic estimates.
Risk of Stand-Replacing Fire in Dry Forest Types	Due to changes in species composition and over 80 years of fire suppression, stand-replacing fire is one of the greatest risks to dry forest types. Using the SIMPPLLE Model (Simulating Vegetative Patterns and Processes at the Landscape Level) changes in risk can be estimated relative to no action.
Impacts to Air Quality	Emissions from prescribed burning and burning activity fuels (i.e., burning piles of logging slash) related to vegetation management will create different levels of emissions. The FOFEM (First Order Fire Effects Model) was used to estimate differences in emissions between alternatives.
Risk of Insects and Root Diseases in Dry Forest Types	Risk of Insects – Bark Beetles – is measured by the acres of effective hazard reduction in areas where the hazard rating is moderate to high. Risk of Root Diseases -- Given the dominance of species (Douglas-fir and grand fir) on the landscape that are susceptible to root diseases, changes in root disease is an important indicator of ecosystem health. The SIMPPLLE model was used to estimate changes in risk relative to no action.
Restoration Costs	Restoring forested ecosystems carries with it some inherent costs. Some of these costs can be mitigated through revenues, i.e., from the sale of wood products harvested in order to meet desired ecosystem objectives. These costs and revenues were compared for each alternative.

b) Aquatics

The following issues and indicators were used to track watershed and fisheries through the effects analysis in Chapter 4.

Table 2-2 Alternative Driving Principal Issues and Indicators: Watershed and Fisheries

Principal Aquatics Issue	Principal Issue Indicators
The effects of harvesting and resulting canopy openings on water yield increases, sediment delivery to streams, and the loss of aquatic habitat throughout the Brush and Mission Creek watersheds.	Percent change in the magnitude, intensity and duration of water yields from the existing condition. Percent change in the magnitude, intensity, and duration of sediment delivery in Mission Ck and Brush Ck watersheds. Total estimated sediment (tons) delivered over the duration of the project in Mission Ck and Brush Ck watersheds

The effects of road construction, decommissioning, and maintenance activities on sediment delivery to streams and aquatic habitat throughout the Mission Creek and Brush Creek watersheds.	Percent change in the magnitude of sediment yields from the existing condition. Change in road densities on sensitive landtypes. Change or improvement to the miles of encroaching roads within riparian areas. Change in the miles of proposed decommissioned roads and the benefits associated with road decommissioning.
The effect of timber harvesting on mass failure potential on the west facing slopes of Hall Mountain.	Risk of mass failure potential and the resulting effects on increases in soil erosion and sediment delivery.

c) Wildlife

The distribution and abundance of wildlife is primarily a function of habitat conditions (vegetation type and successional stage). These conditions reflect inherent potential (capable habitat) and current ability (suitable habitat) of a site to provide essential habitat requirements for a given species as well as disturbance types (fire, wind throw, landslide, and insect outbreaks) and frequencies. Fire suppression and timber harvest have been the predominant factors affecting habitats in the project area.

Disturbances that arise from natural processes or human actions can alter these landscape patterns and wildlife habitat. Wildlife species will occupy their preferred niche on the landscape, and move from place to place as forest structures change and different habitat conditions develop (Clark and Sampson 1995). Consequently, wildlife species will not necessarily persist indefinitely in areas where they are found today because of the dynamic and shifting environments in which they live. Some species are more suited to the early stages of forest succession where grasses, forbs, and shrubs dominate the site, while others are better suited for the later stages of forest development (such as old growth). Other species are more generalists and have adapted to a wide array of vegetation patterns.

As discussed in Forest Vegetation, fire suppression and timber harvest have been the predominant factors affecting habitats near the proposed treatment units. In the absence of fire, much of the area has been converted from relatively open ponderosa pine/Douglas-fir dominated stands to denser stands encroached by young Douglas-fir and grand fir. Past timber harvest near Mission Creek (circa 1920s) has altered the habitat by removing large trees during high-grading operations, including ponderosa pine, western white pine, western red cedar, and western larch. This emphasizes the value of dry habitats within the Mission Brush area and the importance of maintaining and restoring these habitats for species that use them; for example, flammulated owl, white-headed woodpecker, pygmy nuthatches).

A list of threatened, endangered, Forest Service sensitive species, Management Indicator Species, and other species and habitats of special interest was developed from the Forest Service Region 1 list and from known species occurrence on the Bonners Ferry Ranger District. The species list was reviewed to determine each species' relevance to the Mission Brush project, based on known species distribution and habitat availability.

Table 2-3 Alternative Driving Principal Issues and Indicators: Wildlife

Species	Indicator
Northern grey wolf	Increases in vulnerability (road densities) or decreased prey densities
Canada lynx	Changes to key habitat components (denning, unsuitable)
Grizzly bear	Changes in open and total road densities
Black-backed woodpecker	Changes in distribution and quality of snag habitat
Flammulated owl	Trends in habitat suitability
Northern goshawk	Trends in suitable nesting habitat
Fisher	Changes to habitat suitability
Pileated woodpecker	Changes to large snag habitat and old growth habitat
Western Toad	Quality of wetlands and terrestrial habitats
White-tailed deer	Changes to critical mid-winter range
Forest land birds	Changes to priority habitats and vegetative diversity

Table 2-4 lists species (or habitats) and their required level of analysis. Species (or their habitats) that are considered present and possibly affected in a measurable way by the proposed actions will be carried forward into Chapter 4. Species (and their habitats) absent from the project area, or not measurably affected by the proposed actions (i.e., either no effect or impacts would be at a level that would not influence species use or occurrence), are discussed in Appendix A.

Table 2-4 Species Analyzed in Detail (see Chapter 4)

Threatened and Endangered Species Analyzed in Detail		
Species	Rationale for Detailed Analysis	Preferred Habitat
Northern Gray Wolf (*Canis lupus*)	Recent wolf activity documented near the project area. Possible presence of resident pack.	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.
Canada Lynx (*Lynx Canadensis*)	Most of project area lies within established Lynx Analysis Units. Suitable habitat affected.	Higher elevation lodgepole pine and spruce/ fir forests with adequate prey base of snowshoe hares, its primary food.
Grizzly Bear (Ursus arctos horribilis)	Documented recent use within the project area. Northern portion of the project area is in a designated reoccurring use area.	Habitat generalist. Denning areas isolated and remote from human development.

Sensitive Species Analyzed in Detail		
Species	Rationale for Detailed Analysis	Preferred Habitat
Black-backed woodpecker (Picoides arcticus)	Suitable habitat is present in the project area.	Early post-fire forest stands. High densities of small-diameter snags.
Flammulated Owl (Otus flammeolus)	Suitable habitat is present in the project area.	Mature, old growth ponderosa pine, Douglas-fir forest.
Northern Goshawk (Accipiter gentilis)	Suitable habitat for goshawk nesting or foraging is present within the project area. Recent nesting activity documented.	Mature to old growth forest with relatively closed canopies.
Fisher (Martes pennanti)	Suitable denning and foraging habitat in the project area and potentially affected.	Mesic forested habitats
Western 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.
Management Indicator Species Occurring on the Idaho Panhandle National Forests		
Species	Rationale for Detailed Analysis	Preferred Habitat
Pileated woodpecker (Dryocopus pileatus)	Suitable habitat exists within the project area.	Forests with tall, large diameter dead or defective trees for nesting.
White-tailed deer (Odocoileus virginianus) 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.

Table 2-5 Species Not Analyzed in Detail (see Appendices A and B)

Species	Rationale for Elimination from Detailed Analysis	Preferred Habitat
Threatened and Endangered Species Not Analyzed in Detail		
Woodland Caribou (Rangifer tarandus caribou)	The project area is outside of recognized caribou habitat. No recent sightings of caribou in project area.	Above 4,000 ft. in Engelmann spruce/subalpine fir and western red cedar/western hemlock forests.
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.
Sensitive Species Not Analyzed in Detail		
American 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.
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.
Common Loon (Gavia immmer)	Marginal nesting and foraging habitat. Activity areas buffered spatially and temporally.	Large, clear lakes below 5,000 ft. in elevation with at least a partially forested shoreline.
Fringed Myotis (Myotis thysanodes)	Suitable habitat is present in the project area for this species. Treated as a guild with flammulated owl.	Caves, mines, and abandoned buildings, large snag habitat.
Harlequin Duck (Histrionicus histrionicus)	No suitable habitat exists in the project area for this species.	Shallow, swift streams in forested areas.
Pygmy Nuthatch (Sitta pygmaea)	Suitable habitat is present in the project area for this species. Treated as a guild with flammulated owl.	Ponderosa pine habitat, especially mature-old growth stands.
North American Wolverine *(Gulo gulo)*	No suitable denning habitat in the project area. No change in prey densities or increased access to remote areas.	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.
Townsend's Big-eared Bat (Corynorhinus townsendii)	Suitable habitat (e.g. roosting, maternity, hibernation) is present within the project area, but activity areas spatially buffered.	Caves, mines, and abandoned buildings.
Coeur d'Alene Salamander (Plethodon vandykei idahoensis)	Suitable habitat exists in the project area for this species, but will be buffered from activity as necessary.	Springs, seeps, spray zones.
Management Indicator Species Not Analyzed in Detail		
American Marten (Martes americana)	Suitable habitat is present in the project area for this species. Treated as a guild with fisher.	Variable mature confer stands with canopy closures greater than 40 percent with abundant large, down woody debris.

d) Recreation

The purpose and need for this project includes a goal of improving the recreation facilities around Brush Lake (see the following list). Recreation activities would have little to no variation between the alternatives and did not drive development of a separate alternative, as did vegetation, wildlife and aquatics.

- Rehabilitate recreation facilities to restore the quality of the site, to meet universally accessible requirements, and to provide safe access along roadways and to site facilities.
- Design improvements to accommodate current use as well as expected increased future use and with the intent of retaining the rustic character of the camping/picnic area.

- Begin implementation of long-range management guidelines for all vegetation, including ground cover, shrubs, and trees. Primary concerns include public safety, scenery management, perpetuation of a healthy and beautiful forest, and overall enhancement of the recreation facility.
- Upgrade the safety of the existing trail network to meet standards. Trailheads should include signs, maps, and well-posted area boundaries to minimize conflicts between motorized and non-motorized use.
- Manage trail systems by using area closures to designate full range trails (ATV, motorcycle, stock, or mountain bike), and areas for Watchable Wildlife trails (foot traffic only).
- Retain the rustic and generally private character of the dispersed recreation areas.

Forest Plan Recreation Guidelines:
The analysis area includes lands within four Management Areas – MA1, MA4, MA9, and MA17. Forest Plan Recreation guidelines for these MAs are as follows:

- Management Area 1: Provide a diversity of recreational opportunities with an emphasis on full range (motorized and non-motorized) access.
- Management area 4: Provide dispersed recreational opportunities where motorized use is generally restricted to designated route.
- Management area 9: Lower emphasis on a road recreational experience and more emphasis on a trail or backcountry type of experience.
- Management area 17: Appropriate for developed recreation (campgrounds, picnic areas, interpretive displays, etc.) Use can be moderate to high and should emphasize full accessibility. Trails within the facility will generally be non-motorized and fully accessible.

Table 2-6 Issues and Issue Indicators: Recreation

Issues	Issue Indicator
Safety / Universal Accessibility	Changes in safety and accessibility features of developed facilities.
Meeting Future Needs	Change in the number of Persons At One Time
Vegetation Management	Removal of off-site Ponderosa Pine (measured in acres)
Trail Management	Change in amount and types of trails
Dispersed Recreation Facilities	Retaining the rustic and private nature of dispersed recreation areas

2.4 Other Resource Concerns

2.4-A. Changes Between the 2004 FEIS/ROD and Supplemental FEIS

As described in Chapter 1 (section 1.3) new information[1] relative to this project was received in August 2004 and implementation was delayed until a response to the information could be developed. The new information did not bring to light any new concerns regarding the resources or potential effects of the proposed action.

2.4-B. Concerns Identified for the 2004 FEIS/ROD

After reviewing input from public comments and internal scoping, key issues were identified for detailed analysis and evaluation by the Interdisciplinary Team (ID Team). Collectively, the ID team and the District Ranger did not feel that any of the following issues warranted a separate alternative. It has been determined that these issues can be designed into the project through Design Criteria common to all action alternatives, site-specific implementation measures, silvicultural treatments, timing of the proposed action, and associated Knudsen-Vandenburg (KV) projects. None of the KV projects are required for project implementation, however, they would enhance the biodiversity in the project area. Below is a list of resource issues that were eliminated from detailed analysis; further discussions are located in Appendix A.

[1] Lands Council v. Powell, F.3d 1019 (2005). Ninth Circuit Court's amended opinion concerning the Iron Honey project on the Coeur d'Alene River Ranger District of the Idaho Panhandle National Forests.

Biodiversity

Biological Factors, including Noxious Weeds
Threatened Endangered, Sensitive; Management Indicator Species: Wildlife, Fish, and Plants
Linkages
Range / Grazing

Social/Economic Factors

Cultural Resources
Visual Quality
Roadless Area
Minerals
Economics - Community Stability
Public Health and Safety
Effects on Minority and Low Income Populations

2.5 Alternatives Considered but Eliminated from Further Study

Changes Between the 2004 FEIS/ROD and Supplemental FEIS

As described in Chapter 1 (pg. 1-5) new information relative to this project (*Lands Council v. Powell*) was received in August 2004 and implementation was delayed until a response to the information could be developed. The new information did not bring to light any new alternatives to the proposed action.

Alternatives Eliminated From Further Study

Based on the alternative driving issues and other resource concerns, the following alternatives were eliminated from further study.

a) Alternative 5

This was the original Proposed Action, with about 5550 acres of proposed treatment. Timber harvest, prescribed burning, mechanical treatments, and pre-commercial thinning would have been some of the tools used to meet the Purpose and Need listed in Chapter 1. However, this alternative was eliminated from further study because it would exceed water yield and sediment yield standards in Mission Creek.

Alternative 2, a modification of the proposed action, was derived from Alternative 5 and analyzed in detail; it is discussed in detail throughout the EIS.

b) Alternative 6

This alternative was based on the IPNF Forest Plan (1987), timber management goals, which provided an annual Allowable Sale Quantity (ASQ) of 280 million board feet (280 MMBF). The ASQ is not a target or goal, it sets the maximum amount that could be sold in a year.

The primary goals on over 1.5 million acres of the IPNF at that time called for the long-term growth and cost-effective production of commercially valuable wood products. This type of management was based mostly on even-aged silviculture (clearcut, seed tree and shelterwood) and capital investments in transportation systems needed to construct roads to access timber stands. Such an alternative in the Mission Brush project area would treat over 7000 acres, mostly with even-aged regeneration harvests and require about 10 miles of new system (permanent) road construction.

Since the Forest Plan was implemented in 1987, changes in management philosophy have occurred and the IPNF now sells about 60 million board feet (60 MMBF) annually, or about 20% of the ASQ. From an overall multiple resource perspective and given the changes in management philosophy, this did not appear to be a reasonable alternative.

For these reasons the alternative was eliminated from detailed study.

c) Alternative 7

This alternative was developed in response to public comments asking for an alternative that would treat vegetation without commercial timber harvest. The purpose of this alternative was to evaluate the potential of treatments, other than timber harvest, that could be employed in the project area to meet the stated goals and objectives listed in the Purpose and Need discussion in Chapter 1.

Two methods were considered to accomplish this, both of which introduced fire back into these stands. The first one involved prescribed burning the stands, without any site preparation, at temperatures hot enough to kill the majority of the seedling and sapling sized trees and about one-fourth of the pole and saw log sized trees. For a burn like this to be effective, the weather and fuel conditions would have to be very dry. Consequentially, the risk of an escaped fire next to private land would be high.

The second method would have included some felling of the unwanted trees, followed up with prescribed burning. This could be done under more moist conditions than the first method, however, with the acres involved and the proximity to private lands, this would still be very risky.

Both of these methods, regardless of success rates would have the following consequences:

- violate air quality standards,
- risk losing the entire organic (duff) layer to the burns, which is a violation of Region 1 soil quality standards and,
- waste wood fiber that could be utilized as commercial products.

For these reasons, this alternative was dropped from further consideration and study.

2.6 Alternatives – Changes Between 2004 & 2006

This section describes Alternative 2, (the Modified Proposed Action), Alternative 3, and Alternative 4 as developed by the Interdisciplinary Team to address the issues that were outlined earlier in this chapter and to be responsive to concerns expressed by the public and internal resource specialists.

The proposal also includes design criteria, or features, developed by the resource specialists to address the issues that did not warrant analysis of separate alternatives. For example, cultural heritage and sensitive plant concerns vary little, if any, between alternatives; they lend themselves to being treated in a common manner for all action alternatives (Alternatives 2, 3, and 4). A listing of the Common Features and Required Design Criteria for Alternatives 2, 3, and 4 is included in Section 2.7 to avoid repetitive description of the features that do not change from alternative to alternative.

a) Changes Between the 2004 FEIS/ROD and Supplemental FEIS

As described in Chapter 1, new information relative to this project was received in August 2004 and implementation was delayed until a response to the new information could be developed. The new information did not bring to light any new alternatives to the proposed action.

During unit layout in the fall of 2004 an area with a perched water table was found in Unit 62 and portions of Unit 63, Because these units would be shelterwood treatments, there is high potential for many of the leave trees to blow over. The conditions and risks were evaluated by an interdisciplinary field review of the area. The district hydrologist, hydro technician and the project forester reviewed the drainage patterns and the expanse of the perched water table. The situation and the proposal were also discussed with the silviculturist and wildlife biologist.

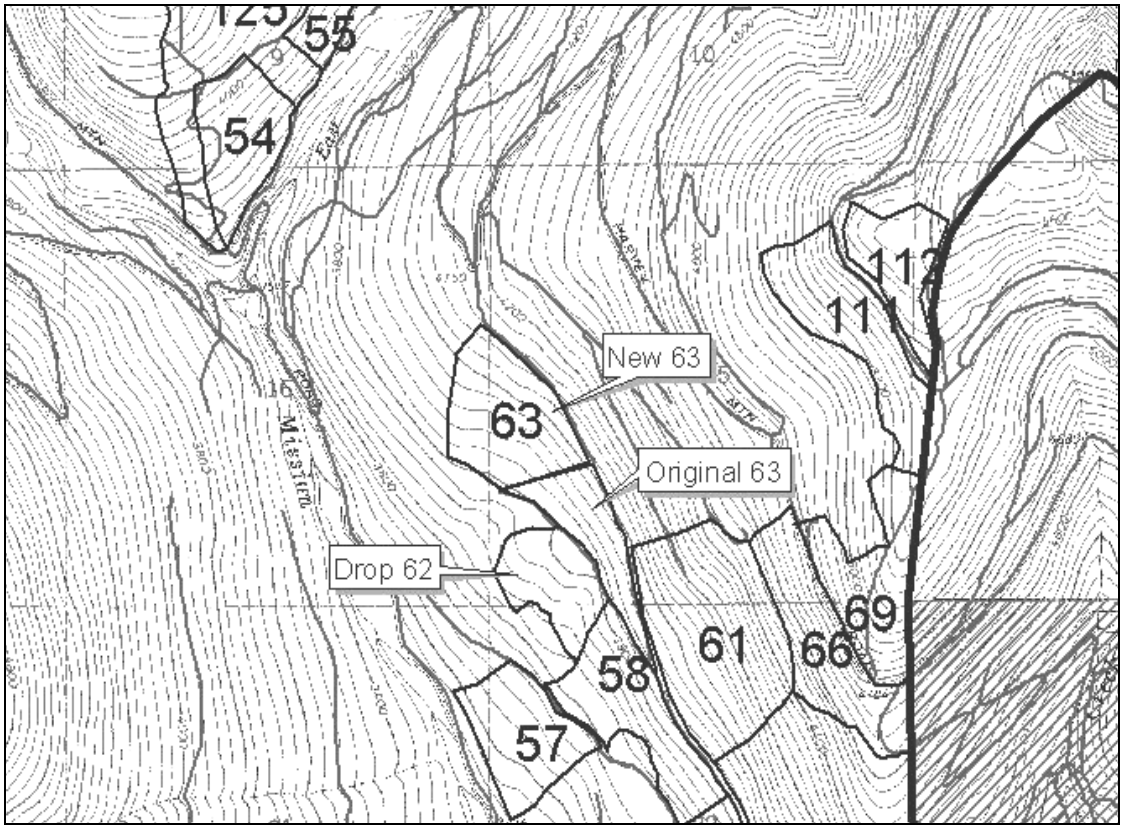
After the interdisciplinary review, Unit 62 was dropped (30 acres) and Unit 63 was shifted to the northwest, (see map). The adjusted Unit 63 will be about 35 acres - about eight acres larger than originally proposed. However, the total acres of treatment has been reduced from approximately 57 acres (both Units 62 and 63 as originally proposed), to a total of approximately 35 acres. A net reduction of approximately 22 acres.

The proposed changes were analyzed, with the following results:

- No T&E or MIS plant or animal species or their habitat would be negatively impacted by dropping Unit 62 and moving Unit 63.
- The proposed changes in Unit layout would not constitute any change in the effects analysis for wildlife resources (see Chapter 4 and Appendices A and B).
- The proposed changes in unit layout would not constitute any increase in the effects analysis for aquatics resources. The net effect would be less, because 22 fewer acres would be treated than were originally analyzed.
- No new reasonably foreseeable actions have been proposed on federal or private land in the cumulative effects area.

Figure 2-1. Changes to Units 62 and 63

This map shows the shift in Unit 63 (away from the area with the perched water table) and the removal of Unit 62 from the proposal.



2.7 Alternatives Considered in Detail

Based on the alternative driving issues and other resource concerns, the following alternatives were analyzed in detail.

2.7-A. Alternative 1 - No Action

The No Action alternative provides the resource specialists a means for evaluating the current ecosystem conditions as a baseline. It can also be used to compare the projected effects of each management alternative. The decision-maker and members of the public can use No Action to look at the differences that would take place under the other alternatives, as well as the consequences of deferring activities if this alternative is selected.

It is important to keep in mind that “No Action” does not mean there would be no further management within the project area. The current level of management would continue. Activities such as fire suppression, projects analyzed in earlier environmental analysis and decisions, and routine road and trail maintenance would continue. A list of Reasonably Foreseeable Activities, which would not be affected by this EIS and subsequent Record of Decision, is included in Chapter 1. Selection of this alternative would defer all the proposed treatment activities at this time.

Under the no action alternative, none of the proposed silvicultural treatments, prescribed burning, road improvement or watershed improvement activities would be implemented with this project. No action would be taken at this time to restore vegetative composition and structure, improve wildlife habitat, or maintain hydrologic function and improve the aquatic resources. Recreation improvements would not occur at this time. Stands would thin themselves out as the competition for water and soil nutrients continues, and fuels would continue to build up with continued fire suppression, leading to increased risk of stand-replacing fire and its associated negative effects over time.

2.7-B. Alternative 2 – Modified Proposed Action

Alternative 2 was derived from the original proposed action, which was dropped from further analysis because of watershed concerns (see Alternative 5 described previously). This alternative is an integrated multi-disciplinary approach to ecosystem management. It is designed to:

- begin the restoration of forest ecosystem processes, vegetation composition and structure improve dry site old growth habitat and return the role of fire back into the ecosystem
- reduce sediment entering aquatic systems from old roads
- improve various wildlife habitat structural components (i.e. flammulated owl)
- meet the recreation goals in the project area

Under Alternative 2, the restoration of forest composition and structure would be met through a combination of silvicultural treatments and prescribed burning. Water quality, fisheries, and wildlife issues are also addressed.

(Acres and miles shown below are estimates based on GIS coverages, computer calculations, and field visits.)
Vegetation restoration activities on 57 treatment units, totaling 4255 acres (includes tree girdling units and ecosystem prescribed burns).

- Fuels treatments would occur in 51 units, totaling 4119 acres (does not including tree girdling units).
- Ecosystem burns to benefit wildlife would be conducted on 2 areas, totaling 238 acres.
- There would be 5 miles of temporary road construction; about one-half of which opens existing, undriveable roads and half is construction of new temporary roads. The entire 5 miles would be decommissioned after harvesting, harvest-related activities, and other treatments are complete.
- Improvements and maintenance of the transportation system (roadside brushing, surface maintenance, etc.) would be made on 39 miles of roads that will be used as haul routes.
- Existing roads to be placed in storage total 5 miles.
- Existing roads to be decommissioned total 13 miles.

Of the roughly 13 miles of road proposed to be decommissioned, about 10.1 miles are currently inaccessible to motorized traffic due to vegetation on the road way. Even though these roads are brushed in, they still pose a risk to watershed resources due to active ditch lines and culverts. See Figures 2.6 and 2.7 for locations of road proposals.

Recreation goals for Brush Lake Campground would be met through the following activities:
Off-site ponderosa pine would be removed and native species would be established. As the native trees mature, care would be given to retaining several scenic vantage points along the access roads. The off-site pine is identified as vegetation treatment units 6, 7, 9 and 13 (see Table 2-6 and Figure 2-2 for details).

- Improve the existing road surface using crushed aggregate surfacing and establish adequately sized turnouts for recreational vehicles.
- Upgrade toilets to concrete universally acceptable Sweet Smelling Toilets (SSTs). Also, upgrade the pathways to meet accessibility guidelines for wheel chair access.
- Reconstruct the path between the campground and picnic area to meet the easiest hiker standard using gravel and boardwalks as appropriate.
- Utilize the old road and skid trail networks in the vicinity of Brush Lake as designated trails that are clearly defined as open or closed to ATVs, motorcycles, stock, mountain bikes, and hiking. Mark the trails with interpretive signs, boundary markers, and maps to delineate areas for motorized and non-motorized use in the Brush Lake area (see Figure 2-1).
- All non-system cutoff paths, roads, and campsites would be rehabilitated and protected.
- The current camping area contains four single-unit campsites. One group campsite site and three to five day use sites would be added.
- Neither water nor electricity will be provided at Brush Lake recreation facilities.
- Persons Accessing at One Time (PAOT) would raise from current level of 34 to a maximum of 48.5.

Recreation goals for the day-use picnic area at Brush Lake would be met through the following:
Install a new standard design concrete boat ramp.

- Upgrade the parking lot size to accommodate two or three pickup/small boat trailer combinations. Currently only one pickup and trailer can turn around safely.
- Construct a new 40-foot fishing dock with four or five additional parking spots. The current dock safely accommodates four people.
- Persons Accessing at One Time (PAOT) would raise from current level of 27.5 to a maximum of 33. The maximum increase in PAOTs for additional sites along the access road would be 17.5. Total PAOTs for all Brush Lake recreation facilities would be 99.

Recreation goals for the trail systems in the project area would be met through the following:

- Mission Mountain Trail #156 would remain open to all non-motorized use. The trailhead would have adequate turnaround and parking for two or three passenger vehicles. Parking for trucks with stock trailers would be provided as close to the trailhead as possible. The trail would be refurbished to a moderate difficulty level for hikers and stock users. Trail tread at road crossings and at the junction with the Arndt Trail would be reestablished.
- The historic Wildhorse Trail near Brush Lake would not be reestablished in full. A short segment will be identified with an interpretive sign near the Brush Lake campground.

Dispersed Recreation goals would be met through the following:
Camping areas would remain rustic and generally private.

- Road systems will remain suitable for activities such as berry picking, cutting Christmas trees, and hunting.

The figure below shows the current layout of the Brush Lake facilities and the location of the proposed expanded parking area for vehicles with boat trailers, and approximate locations of the Watchable Wildlife Trail, and new larger dock.

Figure 2-2. Brush Lake Facilities Upgrades

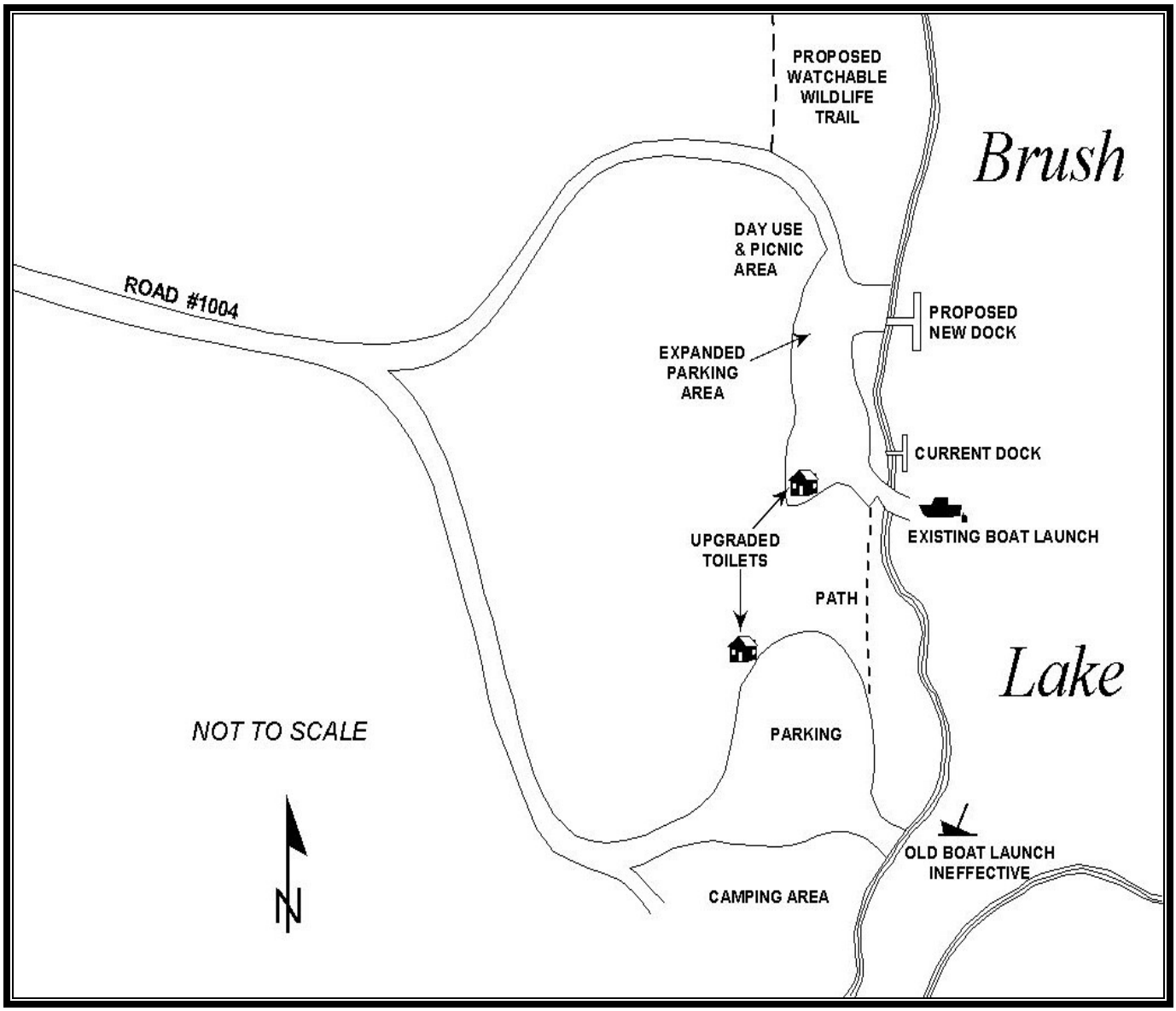


Figure 2-3. Proposed Recreation Area Designations

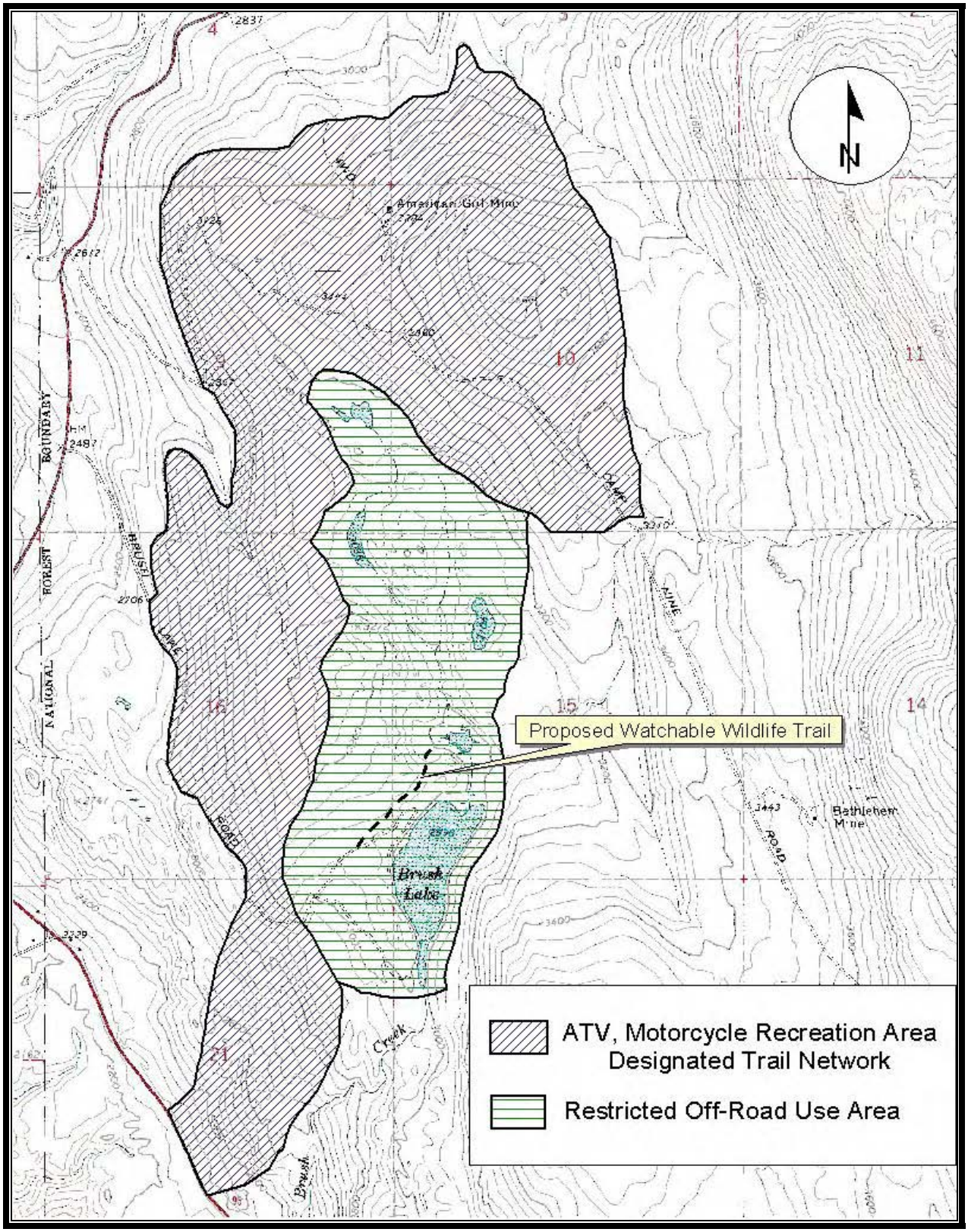
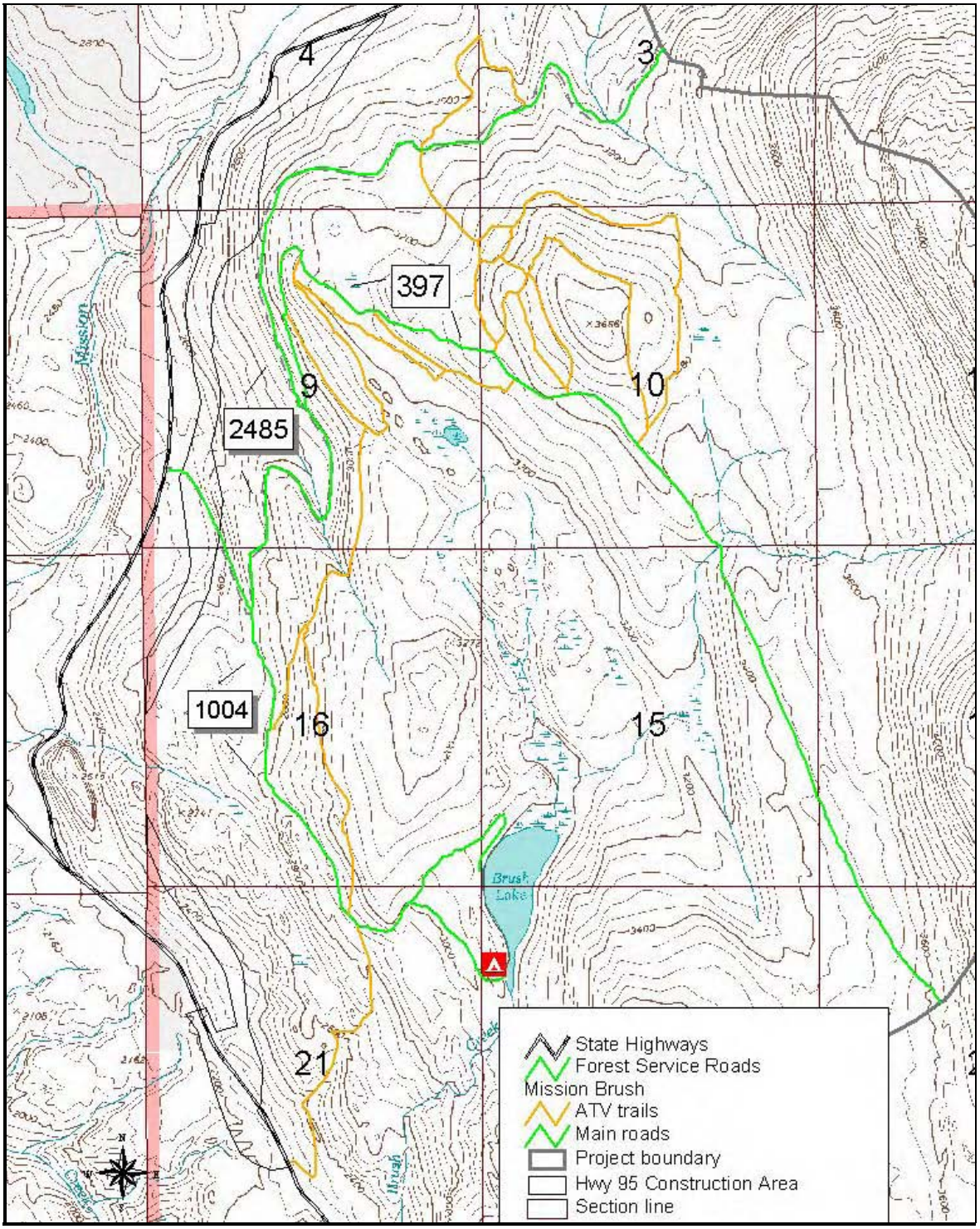


Figure 2-4. Brush Lake Area ATV Trail Network

As shown on this map, the Brush Lake area ATV trail network utilizes about 10 miles of the Forest Service road system (Roads #397, #1004,and #2485) and incorporates about 10 miles of old skid trails where the ATV use is increasing. (See Recreation discussion in Chapters 3 and 4 for more information.)



See Tables 2-13 through 2-15 at the end of this chapter for detailed information about the Brush Lake Campground, recreation area designations and ATV trail proposals.

b) Alternative 2 Comparison to Alternatives 3 and 4

Vegetation Treatments (approximate acreages)
Alternative 2 includes silvicultural treatments on 4014 acres
Alternative 3: 3303 acres
Alternative 4: 3073 acres

Fuel Reduction Treatments (approximate acreages) (Does not include tree girdling units or ecosystem burns)
Alternative 2 would treat fuels (logging slash) on 3878 acres;
Alternative 3: 3303 acres
Alternative 4: 2936 acres
Fuels treatments include limbing and lopping except in helicopter system harvest units next to private property. In these units, treetops will be removed to reduce fuels.

Logging Systems (approximate acreages)
Helicopter systems
Alternative 2: 1306 acres
Alternative 3: 1255 acres
Alternative 4: 1098 acres.
Ground-based (tractor)
Alternative 2: 1213 acres
Alternative 3: 855 acres
Alternative 4: 830 acres
Skyline
Alternative 2: 429 acres
Alternative 3: 398 acres
Alternative 4: 111 acres
A *combination* of systems
Alternative 2: 930 acres
Alternative 3: 795 acres
Alternative 4: 896 acres

Ecosystem Prescribed Burning for Wildlife Habitat – Alternatives 2 and 4 would both treat two areas totaling approximately 238 acres; Alternative 3 does not include these treatments.

Road Management
Temporary Road Construction: Alternative 2 and Alternative 4 include the same amount of temporary road construction (5 miles), followed by decommissioning. Alternative 3 would not construct any temporary roads.
Maintenance / Improvement:
Alternative 2 includes 39 miles
Alternative 3: 37 miles
Alternative 4: 26 miles
Road Decommissioning and Storage: Proposed storage and decommissioning of existing roads is the same for all action alternatives.

Wildlife Habitat – In general, the alternatives are expected to affect the species analyzed in detail in the ways listed below. See Chapter 4 for additional information and details of the potential effects to wildlife.

> Canada Lynx – Alternatives 2, 3, and 4 would meet the lynx habitat condition standards set forth in the Lynx Conservation Assessment and Strategy. Most of the proposed units that were located in lynx habitat are not included in Alternative 4.
>
> Grizzly Bear – Since the Mission Brush area is outside the designated grizzly bear recovery zone, there are presently no standards guiding control of motorized access or manipulation of habitat. However, because the northern end of the project area has a historic pattern of grizzly use, the emphasis is to manage this area for

improved habitat conditions for bears. . Road densities are reported as miles of open and total roads per square mile *in the bear use area*. While there are several seasonally restricted roads within this area, most of these roads are only restricted during the big game hunting season, so from the standpoint of grizzly bear habitat they are effectively "open". Alternatives 2, 3 and 4 may temporarily disturb grizzly bears if these activities take place during the bear activity season. However, these alternatives may also enhance foraging opportunities in the future. There will be no permanent increase of road miles in the bear analysis area as a result of this action. Timing restrictions on harvest activities would minimize potential disturbance to grizzly bears.

Gray Wolf -- The most important criteria for wolf management are maintenance of an abundant prey base and minimizing the risk of illegal mortality. It is unlikely that the Mission Brush Project will increase the vulnerability of wolves or influence their ability to use these areas. Prey availability is expected to increase and mortality risk to decrease as a result of this action. According to USFWS, successful wolf recovery in the northern Rocky Mountains does not depend on land-use restrictions - with the possible exception of temporary restrictions around active den sites on federally managed lands - due to the ability of gray wolves to thrive under a variety of land uses (USDI 2003).

Flammulated Owl -- In reversing the general trend toward understory congestion and increased fire risk in dry-site stands, these alternatives would enhance flammulated owl habitat in the long term. In the short term, there would be no decrease in suitable habitat acres as a result of these alternatives. Treatment would allow flammulated owls to maintain their same general distribution, thus maintaining species viability. Therefore, Alternative 2, 3, or 4 may provide favorable long-term (in this case, approximately ten years or more) changes to available habitat for this species. However, while there would be no planned loss of currently suitable flammulated owl nesting habitat due to the action alternatives, the temporary disturbance or potential diminution of forage (lower densities of noctuid moths due to reduction of shrub canopy) from project-related activities may cause short-term negative impacts to this species in the immediate vicinity of harvest units.

Black-backed Woodpeckers – Although Alternatives 2, 3, and 4 would reduce the quantity of available snag habitat, tree mortality would continue to persist in the analysis area, allowing black-backed woodpeckers to maintain populations at low endemic levels. Consequently, Alternatives 2, 3 and 4 may impact black-backed woodpeckers or their habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. For these alternatives, black-backed woodpecker populations would remain at reduced densities and their current distribution would be sustained. All proposed alternatives would meet and exceed Forest Plan goals and objectives for managing snag habitat (USDA 1987, Appendix X).

Northern Goshawk – In reversing the general trend toward understory congestion and increased fire risk, Alternatives 2, 3, and 4 would result in increased suitable habitat over time. Possible short-term (15 years or less) impacts to goshawk habitat will be offset by long-term (>15 years) improvements in habitat for this species. The cumulative effects analysis area would continue to provide at least three suitable 30-acre nest areas per 5,000-6,000 acres in all alternatives. Alternatives 2, 3, or 4 would allow goshawks to maintain their same general distribution, thus maintaining species viability.

Fisher – On the Bonners Ferry Ranger District, the amount of fisher denning habitat is comparable to the quantity available historically, as evidenced by comparison of the sum of mature/large and old growth forest size classes now versus historically. Despite a general direction on the IPNF to trend stands toward a more seral state, there has also been an effort to preserve mature and old-growth stands, allow natural succession in riparian areas, and preserve and recruit large woody debris forest wide. While this management strategy may temporarily reduce fisher habitat at the local scale, habitat should improve for this species with time and should be maintained on a landscape scale.

In addition, standards outlined in the LCAS will benefit fisher as well as lynx. These standards assure that high quality denning habitat will be protected, that there will be limits to the amount of deforestation over a given decade, and that snowshoe hare habitat will be protected to supply high densities of this important prey species. INFISH guidelines and BMPs will assure that riparian habitats important to fishers will be undisturbed.

Western Toad -- The proposed project recreation improvements may result in occasional direct mortality to dispersing Western toads, although a some mortality from current use is probably occurring already. These improvements should also reduce disturbance to breeding habitat by directing ORV use away from sensitive areas where use is currently unrestricted. All three action alternatives may cause adverse impacts to toads during project implementation. However, this risk is considerably reduced by project design features including timing restrictions, INFS buffers and BMPs. In addition, Alternative 3 further reduces this risk by eliminating

road construction and limiting timber harvest to the non-active period in the most sensitive habitat area (Brush Lake and associated wetlands). Although the action alternatives may slightly elevate the risk of direct toad mortality, no breeding habitat will be affected by this proposal.

Pileated Woodpecker -- The proposed project incorporates design features that maintain minimum numbers of snags within the harvest units. In addition to this, there are numerous snags being created outside of the proposed units that would not be treated. This is true over the entire Idaho Panhandle National Forests as well as the North Zone (Bonners Ferry, Sandpoint and Priest Lake Ranger Districts). Thus, even if snags were reduced on a portion of the landscape, the total number of snags is increasing at a more rapid rate than they are being removed. Further, fuel reduction in the form of removal of some dying trees is beneficial in the long term to this species, as outlined in the flammulated owl and northern goshawk sections, because of the reduction of fire risk. Although this project and the others proposed for the Idaho Panhandle National Forests would make only a small decrease in fuel loading, it is an incremental beneficial effect that cumulatively over time should assist in reducing the risk of stand-replacing fires. For pileated woodpeckers, stand-replacing fires are a negative impact because they reduce the canopy even though they also create large numbers of snags. Treatment would trend stands toward a larger size classes and older age classes of trees. No treatments are proposed that would reduce old growth structure or integrity.

White-tailed Deer -- White-tailed deer are presently at historically high densities. While the proposed activities would eliminate 45 acres of critical mid-winter range, these activities would also result in improved forage quantity and quality on traditional winter range. The adaptability and prolific reproductive potential of this species make it highly unlikely that habitat degradation on a small scale would cause lasting effects. Consequently, Alternatives 2, 3, and 4 may impact white-tailed deer or their habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Forest Land Birds – All alternatives would increase habitat richness and diversity; thus, providing more niches for birds. Treatments would encourage structural enhancement and long-term stability of priority habitats, particularly dry ponderosa pine/Douglas-fir forests. While the Forest Plan does not address specific Standards or Guidelines for managing forest landbirds, 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. Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

Recreation – The proposals for Developed Recreation facilities, Dispersed Recreation and Trails are the same for all action alternatives. See pages 2-17 through 2-20.

Silvicultural Treatments -- Several silvicultural treatment methods will be used to meet the Purpose and Need for this project. The following descriptions of silvicultural treatments apply to Alternatives 2, 3, and 4.

Group selection prescriptions (uneven-aged management) will create a mosaic of forested openings and thinned areas. The openings will treat the areas in the stand with the highest risk of insect, disease and ladder fuels. Ponderosa pine and larch would regenerate in these openings; the thinned areas would favor the retention of the largest existing ponderosa pine, Douglas-fir, and larch.
Commercial thinning will improve the health and vigor of the residual stands by favoring the development of the biggest and best quality trees. Ponderosa pine, western larch and white pine would be the favored species.
Sanitation and salvage treatments would occur in areas where small pockets of insect and disease occur (generally less than two acres in size). Examples include areas with a high risk of mountain pine beetle infestation, or in root disease centers.
Improvement cutting will be used to increase the overall quality and integrity of the dry site old growth stands. Removing ladder fuels from below and around the large old relic trees will lower the risk of stand-replacing crown fires. Periodic underburning every 5 to 25 years as appropriate will be used to maintain the old growth stand composition and structure.
Regeneration harvesting will use the irregular shelterwood and seed tree with reserve tree methods.
Underburning will have multiple roles in beginning the restoration of desired attributes in the proposed treatment units. Fire will be used as tool to burn slash, recycle nutrients, resprout decadent brush (browse for wildlife), reduce heavy duff layers around relic trees, harden the bases of ponderosa pine (creating long-standing, rot-resistant snags for wildlife), and prepare the units for natural or artificial regeneration (planting) into seral species.
Girdling of mistletoe infected trees in and around existing and proposed regeneration units will be used to alleviate the spread of the parasitic plant directly into the young healthy understory of larch (see Chapter 3).

Figure 2-5. Alternative 2

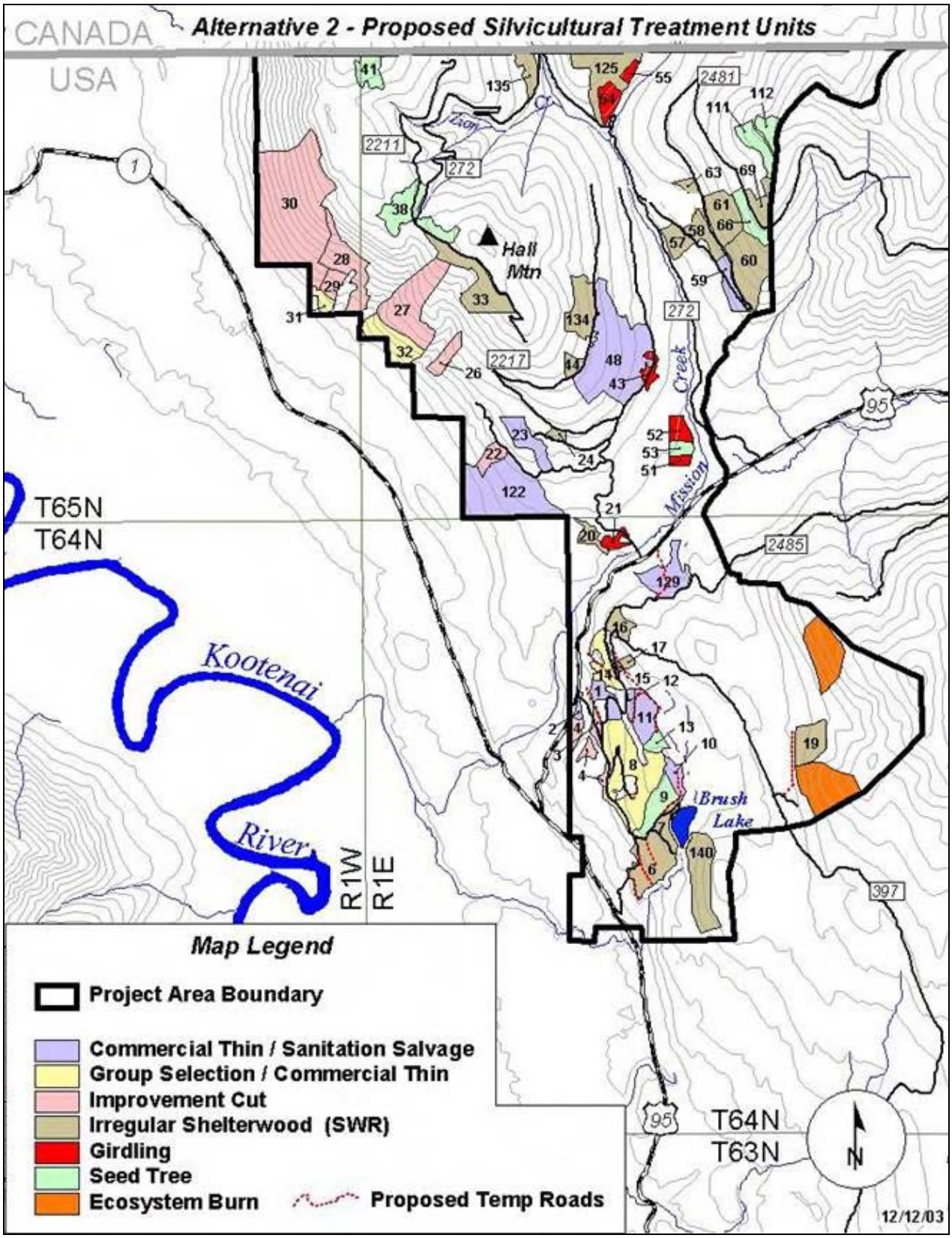


Table 2-7 Alternative 2 Restoration Treatments

1	37	CT/SS	T	UB	75	55
2	12	CT/SS	T	GP	85	75
3	9	IC	S	GP	95	75
4	52	IC	T	UB/GP	85	25
6 *	114	ISW	T/S/H	GP/UB	80	25
7 *	34	ISW	T	GP/UB	80	20
8 *	232	GS/CT	T/S	GP/UB	70	50
9 *	67	ST	T	GP/UB	95	15
10	28	CT/SS	T	GP	85	65
11	61	CT/SS	T	GP	85	65
12	14	CT/SS	S	UB	85	65
13 *	20	ST	T	GP/UB	85	15
14	51	GS/CT	T/S	GP/UB	75	55
15	6	ISW	T	UB	95	35
16	34	ST	T/S	UB	85	15
17	9	ISW	T	UB	85	35
19	67	ISW	T	GP/UB	85	25
20	26	ISW	T	UB	85	25
21	20	GIRDLING	N/A	N/A	25	20
22	30	IC	S	UB	80	25
23	63	CT/SS	T	UB	70	50
24	12	ISW	S	GP/UB	95	25
26	34	IC	H	GP/UB	75	30
27	176	IC	H	UB	75	30
28	114	IC	H	UB	75	50
29	29	IC	H	UB	75	40
30	507	IC	H	UB	65	40
31	22	GS/CT	H	GP/UB	40	30
32	83	GS/CT	H	UB	40	30
33	125	ISW	S	UB	80	40
38	114	ST	T	GP/UB	80	25
41	50	ST	H	GP/UB	90	15
43	23	GIRDLING	N/A	N/A	15	10
44	20	ISW	T	UB	80	25
48	324	CT/SS	S/T	GP	95	75
51	13	GIRDLING	N/A	N/A	15	10
52	29	GIRDLING	N/A	N/A	15	10
53	20	ST	T	GP/UB	90	15
54	38	GIRDLING	N/A	N/A	15	10
55	13	GIRDLING	N/A	N/A	15	10
57	39	ISW	T	GP/UB	85	30
58	48	ISW	S	GP/UB	80	20
59	46	CT/SS	S	GP/UB	70	50
60	133	ISW	H	UB	95	20
61	87	ISW	H	UB	80	20

Unit	Acres	Rx	Logging System	Fuels Treatment	PCC Before Treatment	PCC After Treatment
63	35	ISW	S	GP/UB	70	20
66	52	ST	S	UB	65	15
69	46	ISW	H	GP/UB	75	25
111	51	ST	S	UB	85	15
112	30	ST	T	UB	85	15
122	256	CT/SS	T	UB	20	15
125	123	ISW	T	UB/GP	85	25
129	86	CT/SS	T	GP	95	80
134	86	ISW	T	GP/UB	80	25
135	39	ISW	T/S	GP/UB	75	25
140	128	ISW	S/T/ H	GP/UB	65	35
Ecosystem Burn	110	Brush field	NA	UB	20	10
Ecosystem Burn	128	Brush field	NA	UB	20	10
Total	4255					

*Units 6, 7, 8, 9 and 13 -- contain “Off-site” Ponderosa Pine

Rx = Silvicultural prescription
PCC = Percent canopy closure
CT = Commercial thin
SS = Sanitation Salvage
ISW = Irregular Shelterwood
ST = Seed Tree
GS = Group Selection

UB = Underburn
GP = grapple pile
H = Helicopter
S = Skyline (Cable)
T = Tractor
GS = Group selection
IC = Improvement Cut

The proposed openings that will exceed 40 acres (Units 6, 7, 9, 19, 33, 38, 41, 57, 58, 60, 61, 66, 69, 111, 112, 125, 134, and 140) have been incorporated into the watershed, wildlife, fire, and visual analysis. The Bonners Ferry Ranger District is proposing these openings as they are an integral part to ecosystem restoration in the project area. The district has received Regional Forester approval to exceed the 40-acre limit, as required in the Forest Service Handbook (project file letter dated May 11, 2004).

Table 2-8 Alternative 2 – Silvicultural Treatment Summary

Treatment -- Commercial Thin and Sanitation Salvage Cut (CT/SS)			
1 2 10 11 12 23 48 59 122 129	37 12 28 61 14 63 324 46 256 86 Total 927	Generally, these are 70-90 year old mixed conifer stands. The primary overstory species is Douglas-fir, with lesser amounts of lodgepole pine and larch. Grand fir, cedar, and hemlock are generally minor components. These stands are overstocked, and growth is declining. Root disease centers are usually less than two acres.	A combination of commercial thinning and sanitation-salvage would be prescribed to maintain the health and vigor of these stands. Generally, the larger-diameter trees with full live crowns would be retained. Poor quality smaller trees would be targeted for removal. These would mostly be suppressed trees with very little live crown. Dead and dying trees not needed to meet snag management requirements would also be removed.
Treatment -- Group Selection Cut (GS/CT)			
8 14 31 32	232 51 22 83 Total 388	These are low elevation stands (less than 4000 feet above mean sea level) n a rural urban-interface setting. Overstory species such as ponderosa pine, Douglas-fir and larch are common. In many places the Douglas-fir component is infested with dwarf mistletoe and root disease. Understory trees are composed of thickets of Douglas-fir and grand fir which have formed ladder fuels.	In order to protect the stands from crown fire and restore the historical stand structure, group selection cuts from one to five acres in size would be used to create a mosaic of forested openings and thinned areas.. These openings will often encompass root disease centers in areas of susceptible Douglas-fir, allowing the area to be reforested with relatively root disease resistant seral species such as ponderosa pine, larch or white pine. Large diameter ponderosa pine, larch, and Douglas-fir relic trees and snags will be left in the group selection openings for future stand structure, snags and genetic seed banks. Commercial thinning and sanitation-salvage harvesting would be carried out between the group selection openings to maintain the health and vigor of these trees. Generally, the larger-diameter trees with full live crowns would be retained. Trees that are of poor form or suppressed would be targeted for removal. Dead and dying trees not needed to meet snag management requirements would also be removed.

Unit			
Treatment – Improvement Cut (IC)			
3 4 22 26 27 28 29 30	9 52 30 34 176 114 29 507 Total 951	These are dry forest stands that contain large-diameter ponderosa pine, Douglas-fir, and a few western larch. Portions of these units are classified as dry site old growth. The understory is primarily small-diameter thickets of Douglas-	The objective is to improve, and maintain the development of the larger-diameter ponderosa pine and larch as future old growth and restore old growth and restore old growth characteristics to the dry site stands. Smaller diameter Douglas-fir and grand fir that have invaded the stand in the absence of fire would be removed and unit would be underburned. In order to maintain and improve the old growth attributes of the stands, they will be underburned every 10 to 25 years as appropriate.
Treatment – Irregular Shelterwood Cut (ISW)			
6 7 15 16 17 19 20 24 33 44 57 58 60 61 63 69 125 134 135 140	114 34 6 34 9 67 26 12 125 20 39 48 133 87 35 46 123 86 39 128 Total 1210	These stands have thick overcrowded overstories, dominated by lodgepole, larch, and Douglas-fir. The larch, lodgepole, and white pine component of the stands are declining in health and are being replaced by cedar, grand fir and hemlock. In the case of white pine, blister rust has nearly eliminated this species. The understories in these units are nearly impenetrable thickets composed of grand fir, cedar, and hemlock. * In the case of Units 6 and 7, the overstory is predominately “off-site” ponderosa pine that is not genetically adapted to the local area. Most of the ponderosa pine is currently dead or dying from bark beetles. Consequently, the bark beetle population is increasing and spreading to adjacent stands native ponderosa pine.	The objective would be to favor the development of larch and white pine. Generally, the larger-diameter trees with full live crowns would be retained for seed, shelter and future snags for the new stand. Dead and dying trees not needed to meet snag management requirements would be removed. The logging slash and undesirable understory trees would be burned using grapple piling and underburning where appropriate. Units would be reforested with ponderosa pine, larch and white pine where appropriate.

Treatment – Seed Tree (ST)			
* 9 * 13 38 41 53 66 111 112	67 20 114 50 20 52 51 30 Total 402	These are over mature stands that are dominated by lodgepole pine, Douglas-fir, grand fir, cedar, and hemlock. The larch, lodgepole pine and white pine component of the stand are declining in health and are being replaced by cedar, grand fir and hemlock. In the case of white pine, blister rust has nearly eliminated this species. * In the case of Units 9 and 13, the overstory is predominately “off-site” ponderosa pine that is not genetically adapted to the local area. Most of the ponderosa pine is currently dead or dying from bark beetles. Now the bark beetle population is increasing and spreading to native ponderosa pine in adjacent stands.	The objective would be to regenerate ponderosa pine, white pine, and larch as appropriate. Focus would be on the removal of the smaller diameter Douglas-fir and grand fir. Generally, the larger-diameter trees with full live crowns would be retained for seed, shelter and future snags for the new stand. Dead and dying trees not needed to meet snag management requirements would be removed. The logging slash and undesirable understory trees would be burned using grapple piling and underburning where appropriate. Units would be reforested with ponderosa pine, western larch and white pine.
Treatment – Girdling			
21 43 51 52 54 55	20 23 13 29 38 13 Total 136	These units were regenerated within the past ten to fifteen years using the shelterwood harvest method. In a typical stand, less than 20 large-diameter trees per acre, originally left for seed and shade, remain. Regeneration has been established and certified.	The overstory trees in and around the plantations with mistletoe infections (larch or Douglas-fir) would be girdled to kill the mistletoe and alleviate the potential spread to the healthy understory trees. The girdled trees would be left as wildlife trees, depending on the snag quota in the unit.

2.7-C. Alternative 3

Alternative 3 was developed in response to public comments regarding the effects of roads and road construction. Concerns included:

The relatively high road density in the project area,

- The level of maintenance the roads receive, and
- Roads as sources of sediment, which can affect aquatic systems.

This alternative describes the expected results of meeting the Purpose and Need of this project while looking at ways to address concerns associated with road systems. It does not include construction of any temporary or permanent roads, while also placing some existing roads into storage and decommissioning other existing roads. Those proposed vegetation treatment units that would be accessed via the temporary roads were not included, or the logging systems were changed to helicopter yarding for this alternative. The restoration of forest composition and structure would be met through a combination of silvicultural treatments and prescribed burning. Water quality, fisheries, wildlife, vegetation, and recreation issues are addressed to varying degrees. The recreation activities are the same for each Action Alternative; see Alternative 2 for their description and potential effects.

(Acres and miles shown below are estimates based on GIS coverages, computer calculations, and field visits.)

There would be no road construction – temporary or permanent.

- Improvements (roadside brushing, surface maintenance, etc.) would be made on 37 miles of roads that will be used as haul routes.
- Existing roads to be placed in storage total 5 miles.
- Existing roads to be decommissioned total 13 miles.
- Vegetation treatment would be undertaken in a total of 36 treatment areas, totaling 3288 acres.
- Logging systems were changed in four treatment units to helicopter yarding rather than skyline, tractor, or a combination of tractor/skyline/helicopter. This changed systems on a total of 231 acres. Tractor (ground-based) logging systems will be used on 11 treatment units totaling 855 acres. A combination of tractor and skyline (cable) will be used on four Units totaling 795 acres. Skyline (cable) systems will be used on 9 units totaling 420 acres.
- Fuels treatments would occur in 36 units totaling 3288 acres.
- Ecosystem burns to improve wildlife habitat would not be conducted

See Tables 2-13 through 2-16 at the end of this chapter for detailed information about these proposals.

a) Alternative 3 Comparison to Alternatives 2 and 4

<u>Road</u> <u>Management</u> – All mileages shown are approximate.
Temporary Road Construction:
Alternative 3 would not construct any temporary roads.
Alternative 2 and Alternative 4 include approximately 5 miles of temporary road construction, followed by decommissioning.
Road Decommissioning and Storage:
Proposed storage and decommissioning of roads is the same for all action alternatives.
Maintenance / Improvement:
Alternative 3 includes about 37 miles,
Alternative 2 includes approximately 39 miles, Alternative 4 has about 26 miles.

<u>Vegetation</u> <u>Treatments</u> – Alternative 3 treats fewer acres and fewer harvest units than Alternative 2.
All acreages shown are approximate.
Alternative 3 treats 3288 acres,
Alternative 2 treats 4255 acres,
Alternative 4 treats 3310 acres.
Alternative 3 does not include girdling of larch and Douglas-fir trees infested with mistletoe; Alternatives 2 and 4 each include 136 acres of tree girdling.

<u>Fuel</u> <u>Reduction</u> <u>Treatments</u> – acreages are approximate. (Does not include tree girdling units or ecosystem burns)
Alternative 3 would treat fuels (logging slash) on 3288 acres
Alternative 2 treats 3878 acres
Alternative 4 treats 3310 acres.
Fuels treatments include limbing and lopping except in helicopter system harvest units next to private property. In these units, treetops will be removed to reduce fuels.

Logging Systems – All acreages shown are approximate.
Helicopter
Alternative 3 would utilize helicopters on 1255 acres
Alternative 2: 1306 acres
Alternative 4: 1098 acres.
Ground-based (tractor) systems
Alternative 3 would use ground-based systems on 855 acres
Alternative 2: 1213 acres
Alternative 4: 830 acres
Skyline (cable) systems
Alternative 3 is about 403 acres
Alternative 2: 451 acres
Alternative 4: 111 acres
Combination of Systems
Alternative 3: 795 acres
Alternative 2: 930 acres
Alternative 4: 896 acres

Ecosystem Prescribed Burning – All acreages shown are approximate.
Alternative 3 does not include any Ecosystem Prescribed Burning
Alternatives 2 and 4 would both treat two areas totaling approximately 238 acres

Wildlife Habitat – See the above Alternative 2 discussion of the general ways in which the action alternatives are expected to affect the species analyzed in detail. Chapter 4 includes additional information and the specific differences, if any, between alternatives.

Figure 2-6. Alternative 3

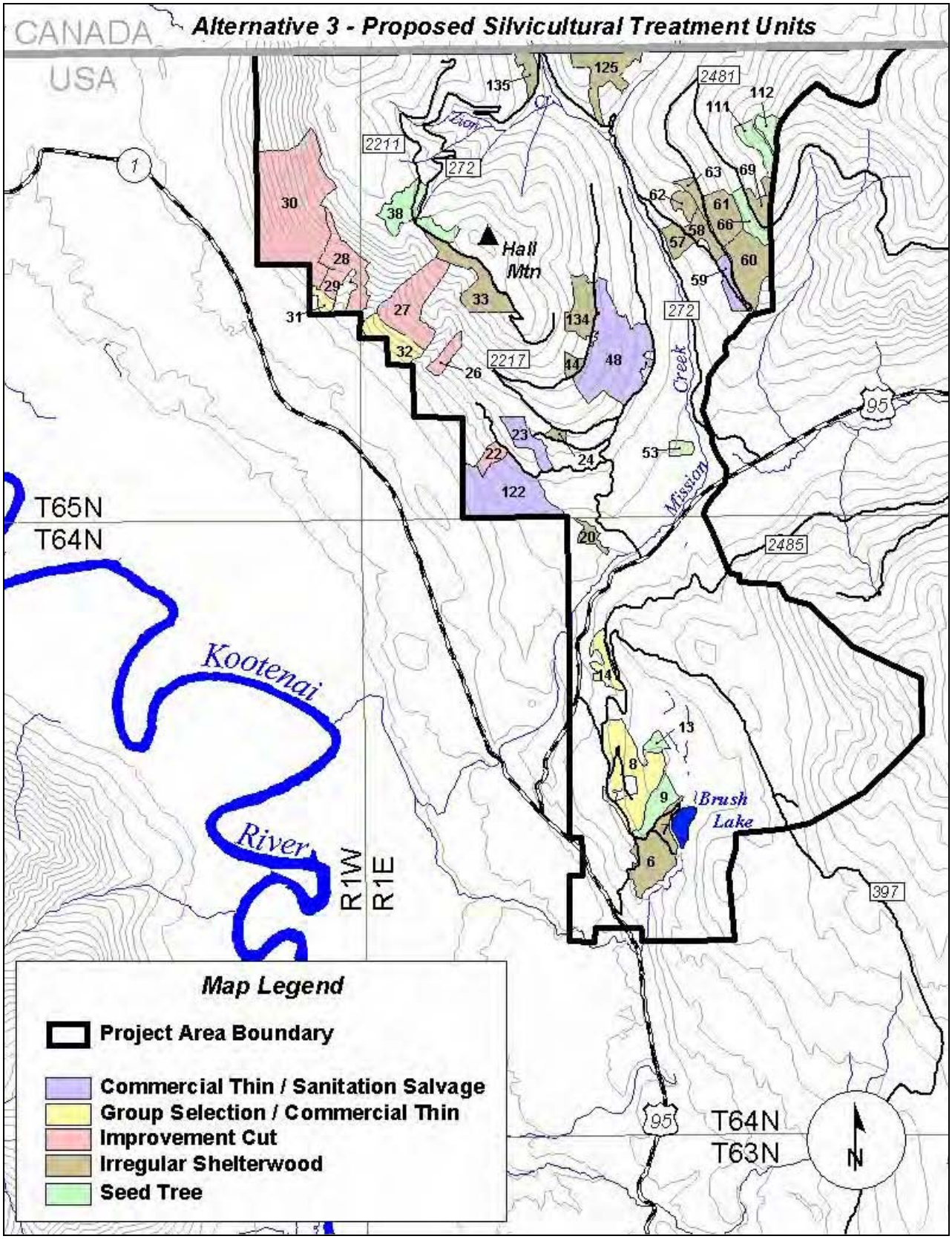


Table 2-9 Alternative 3 Restoration Treatments

Unit	Acres	Rx	Logging System	Fuels Treatment	PCC Before Treatment	PCC After Treatment
6 *	114	ISW	T/S	GP/UB	80	25
7 *	34	ISW	T	GP/UB	80	20
8 *	232	GS/CT	T/S	GP/UB	70	50
9 *	67	ST	T	GP/UB	95	15
13 *	20	ST	T	GP/UB	85	15
14	51	GS/CT	T/S	GP/UB	75	55
20	26	ISW	T	GP	85	25
22	30	IC	S	UB	80	25
23	63	CT/SS	T	UB	70	50
24	12	ISW	S	GP/UB	95	25
26	34	IC	H	GP/UB	75	30
27	176	IC	H	UB	75	30
28	114	IC	H	UB	75	50
29	29	IC	H	UB	75	40
30	507	IC	H	UB	65	40
31	22	GS/CT	H	GP/UB	40	30
32	83	GS/CT	H	UB	40	30
33	125	ISW	S	UB	80	40
38	114	ST	T	GP/UB	80	25
44	20	ISW	T	GP/UB	80	25
48	324	CT/SS	S/T	GP	95	75
53	20	ST	T	GP/UB	90	15
57	39	ISW	TW/S	GP/UB	85	30
58	48	ISW	S	UB	80	20
59	46	CT/SS	S	UB	70	50
60	133	ISW	H	UB	95	20
61	87	ISW	H	UB	80	20
63	35	ISW	S	UB	70	20
66	52	ST	S	UB	65	15
69	46	ISW	H	GP/UB	75	25
111	51	ST	S	UB	85	15
112	30	ST	T	UB	85	15
122	256	CT/SS	T	UB/WLF	20	15
125	123	ISW	T	UB/GP	85	25
134	86	ISW	T	GP/UB	80	25
135	39	ISW	T/S	GP/UB	75	25
Total	3288					

*Units 6, 7, 8, 9, and 13 -- contain “Off-site” Ponderosa Pine

Proposed openings that will exceed 40 acres (Units 6, 7, 9, 19, 33, 38, 41, 57, 58, 60, 61, 66, 69, 111, 112, 125, 134, and 140) have been incorporated into the watershed, wildlife, fire, and visual analysis. The Bonners Ferry Ranger District is proposing these openings as they are an integral part to ecosystem restoration in the project area.. The district has received Regional Forester approval to exceed the 40-acre limit, as required in the Forest Service Handbook (project file letter dated May 11, 2004).

Abbreviations used in Treatments Table 2.9:

Rx = Silvicultural prescription	GS = Group Selection
PCC = Percent canopy closure	IC = Improvement Cut
CT = Commercial thin	GS = Group selection
SS = Sanitation Salvage	T = Tractor
ISW = Irregular Shelterwood	S = Skyline (Cable)
ST = Seed Tree	H = Helicopter
GP = grapple pile	UB = underburn

Table 2-10 Silvicultural Treatment Summary – Alternative 3

Treatment – Commercial Thin & Sanitation Salvage (CT/SS)			
23 48 59 122	63 324 46 256 Total 689	Generally, these are 70-90 year old mixed conifer stands. The primary overstory species is Douglas-fir, with lesser amounts of lodgepole pine and larch. Grand fir, cedar, and hemlock are generally minor components. These stands are overstocked, and growth is declining. Root disease centers are usually less than two acres.	A combination of commercial thinning and sanitation-salvage would be prescribed to maintain the health and vigor of these stands. Generally, the larger-diameter trees with full live crowns would be retained. Poor quality smaller trees would be targeted for removal. These would mostly be suppressed trees with very little live crown. Dead and dying trees not needed to meet snag management requirements would also be removed.
Treatment – Group Selection (GS/CT)			
8 14 31 32	232 51 22 83 Total 388	These are low elevation stands (less than 4000 feet above msl) in a rural urban- interface setting. Overstory species such as ponderosa pine, Douglas-fir and larch are common. In many places the Douglas-fir component is infested with dwarf mistletoe and root disease. Understory trees are composed of thickets of Douglas-fir and grand fir which have formed ladder fuels.	In order to protect the stands from crown fire and restore the historical stand structure, group selection cuts from one to five acres in size would be used to create a mosaic of forested openings and thinned areas. These openings will often encompass root disease centers in areas of susceptible Douglas-fir, allowing the area to be reforested with relatively root disease resistant seral species such as ponderosa pine, larch or white pine. Large diameter ponderosa pine, larch, and Douglas-fir relic trees and snags will be left in the group selection openings for future stand structure, snags and a genetic seed banks. Commercial thinning and sanitation-salvage harvesting would be carried out between the group selection openings to maintain the health and vigor of these trees. Generally, the larger-diameter trees with full live crowns would be retained. Trees that are of poor form or suppressed would be targeted for removal. Dead and dying trees not needed to meet snag management requirements would also be removed.

Alternative 3 Silvicultural Treatments, continued.

Treatment – Improvement Cut (IC)			
22 26 27 28 29 30	30 34 176 114 9 507 Total 890	These are dry forest stands that contain large-diameter ponderosa pine, Douglas-fir, and a few western larch. Portions of these units are classified as dry site old growth. The understory is primarily small-diameter thickets of Douglas-fir.	The objective is to improve, and maintain the development of the larger-diameter ponderosa pine and larch as future old growth and restore old growth characteristics to the dry site stands. Smaller diameter Douglas-fir and grand fir that have invaded the stand in the absence of fire would be removed and unit would be underburned. In order to maintain the old growth attributes of the stands, they will be underburned every 10 to 25 years as appropriate.
Treatment – Irregular Shelterwood Cut ISW)			
6 7 24 33 44 57 58 60 61 63 69 125 134 135	114 34 12 125 20 39 48 133 87 22 46 123 86 39 Total 987	These stand have thick overcrowded overstories, dominated by lodgepole, larch, and Douglas-fir. The larch, lodgepole, and white pine component of the stands are declining in health and are being replaced by cedar, grand fir and hemlock. In the case of white pine, blister rust has nearly eliminated this species. The understories in these units are nearly impenetrable thickets composed of grand fir, cedar, and hemlock. * In the case of Unit six and seven, the overstory is predominately "off-site" ponderosa pine that is not genetically adapted to the local area. Most of the ponderosa pine is currently dead or dying from bark beetles. Consequentially, the bark beetle population is increasing and spreading to adjacent stands native ponderosa pine.	The objective would be to favor the development of larch and white pine. Generally, the larger-diameter trees with full live crowns would be retained for seed, shelter and future snags for the new stand. Dead and dying trees not needed to meet snag management requirements would be removed. The logging slash and undesirable understory trees would be burned using grapple piling and underburning where appropriate. Units would be reforested with ponderosa pine, larch and white pine where appropriate.
Treatment – Seed Tree Cut (ST)			
9 13 38 53 66 111 112	67 20 132 20 51 51 30 Total 370	These are over mature stands that are dominated by lodgepole pine, Douglas-fir, grand fir, cedar, and hemlock. The larch, lodgepole pine and white pine component of the stand are declining in health and are being replaced by cedar, grand fir and hemlock. In the case of white pine, blister rust has nearly eliminated this species. * In the case of Units 9 and 13, the overstory is predominately "off-site" ponderosa pine that is not genetically adapted to the local area. Most of the ponderosa pine is currently dead or dying from bark beetles. Now the bark beetle population is increasing and spreading to adjacent stands native ponderosa pine.	The objective would be to regenerate ponderosa pine, white pine and larch as appropriate. Focus would be on the removal of the smaller diameter Douglas-fir and grand fir. Generally, the larger-diameter trees with full live crowns would be retained for seed, shelter and future snags for the new stand. Dead and dying trees not needed to meet snag management requirements would be removed. The logging slash and undesirable understory trees would be burned using grapple piling and underburning where appropriate. Units would be reforested with ponderosa pine, western larch and white pine.

2.7-D. Alternative 4

Alternative 4 was developed in response to public comments and interdisciplinary considerations for threatened, endangered and sensitive species. This alternative is designed to improve habitat quality and quantity for the Flammulated Owl, Northern Goshawk, and other species listed in Chapter 4. Specific habitat requirements for each species can be found in Chapter 4.

This alternative describes expected results of meeting the Purpose and Need while looking at ways to address concerns associated with wildlife habitats. Proposed treatment areas in lynx habitat were not included in this alternative and silvicultural prescriptions for a few treatment areas were changed. Overall, this alternative responds to flammulated owl, northern goshawk, and pileated woodpecker to a higher degree than Alternatives 2 or 3. It would result in less forage for white-tailed deer; but effects to other components of their habitat would be very similar to those under Alternatives 2 and 3. Alternative 4 would be less favorable to Forest Land birds, than Alternatives 2 or 3. Water quality, fisheries, and vegetation issues are addressed to varying degrees. The recreation activities are the same for each Action Alternative; see Alternative 2 for their description.

(Acres and miles shown below are estimates based on GIS coverages, computer calculations, and field visits.)

Ecosystem burns to benefit wildlife would be conducted in two areas totaling 238 acres.

- There would be about 5 miles of temporary road construction followed by decommissioning of the temporary roads when sale-related activities are completed.
- Improvements (roadside brushing, surface maintenance, etc.) would be made on 19 miles of roads that would be used as timber sale haul routes.
- Existing roads to be placed in storage total 5 miles.
- Existing roads to be decommissioned total 13 miles.
- Vegetation treatment would be undertaken in a total of 37 treatment areas, totaling 3073 acres (total shown does not include 136 acres of tree girdling units and 238 acres of ecosystem burns).
- Logging systems - Ground-based systems will be used on 830 acres. A combination of ground-based and skyline (cable) will be used on 896 acres. Skyline systems will be used on 111 acres. Helicopter logging will be used on approximately 1100 acres.
- Fuels treatments would occur on 2936 acres (total does not include the 238 acres of ecosystem burns).

See Tables 2-13 through 2-16 at the end of this chapter for detailed information about these proposals.

a) Alternative 4 Comparison to Alternatives 2 and 3

Road Management
Temporary Road Construction
Alternative 4: approximately 5 miles temporary roads, followed by decommissioning;
Alternative 2: approximately 5 miles temporary roads, followed by decommissioning;
Alternative 3: no construction of new roads.
Road Decommissioning and Storage Proposals for existing roads is the same for all action alternatives.
Maintenance / Improvement
Alternative 4 has about 26 miles of road maintenance/improvement;
Alternative 2: approximately 39 miles
Alternative 3: about 37 miles.

Vegetation Treatments
Alternative 4: about 3310 acres
Alternative 2: about 4255 acres
Alternative 3: about 3288 acres

Alternatives 2 and 4 each include 136 acres of girdling larch and Douglas-fir trees infested with mistletoe. Alternative 3 does not include the girdling. The variations in vegetation treatment would have various effects to wildlife habitat, see Chapters 3 and 4 and Table 2-16 for additional information.

Fuel Reduction Treatments
Alternative 4 would treat fuels on about 3310acres;
Alternative 2 treats about 4255 acres
Alternative 3 treats about 3288 acres.
Fuels treatments include limbing and lopping except in helicopter system harvest units next to private property. In these units, treetops will be removed to reduce fuels.

Logging Systems
Helicopter systems
Alternative 4: 1098 acres
Alternative 2: 1306 acres
Alternative 3: 1255 acres
Ground-based systems
Alternative 4: 830 acres
Alternative 2: 1213 acres
Alternative 3: 855 acres
Skyline systems
Alternative 4: 111 acres
Alternative 2: 451 acres
Alternative 3: 420 acres
Combination of systems
Alternative 4: 896 acres
Alternative 2: 930 acres
Alternative 3: 795 acres

Ecosystem Prescribed Burning for wildlife
Alternatives 2 and 4 would both treat two areas totaling approximately 238 acres.
Alternative 3 does not include these treatments.

Wildlife Habitat – See the above Alternative 2 discussion of the general ways in which the action alternatives are expected to affect the species analyzed in detail. Chapter 4 includes additional information and the specific differences, if any, between alternatives.

Recreation – The same as Alternative 2.

Figure 2-7. Alternative 4

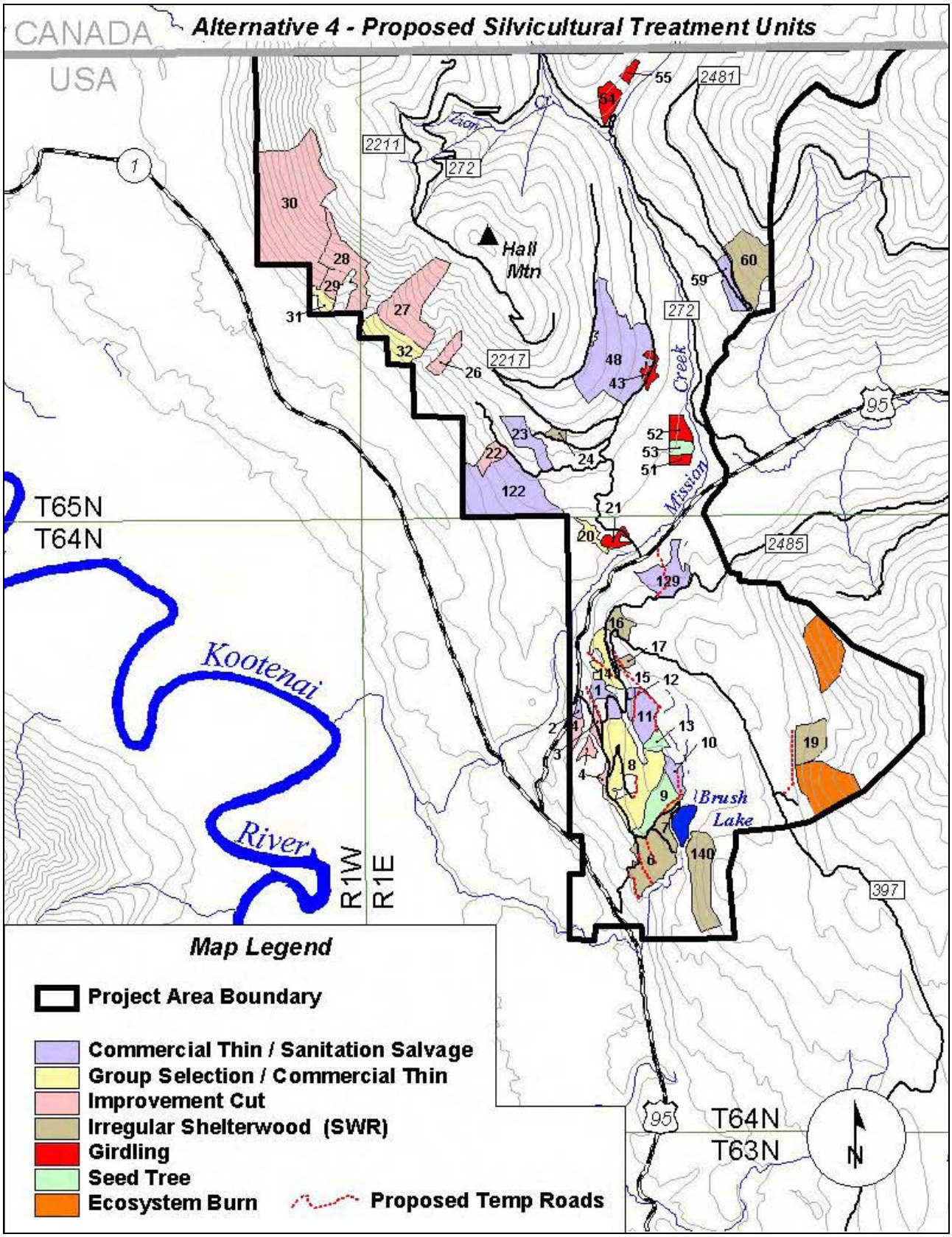


Table 2-11 Alternative 4 Restoration Treatments

Unit	Acre	Rx	Logging System	Fuels Treatment	PCC Before Treatment	PCC After Treatment
1	37	CT/SS	T	GP	75	55
2	12	CT/SS	T	GP	85	75
3	9	IC	S	GP	95	75
4	52	IC	T/S	GP/UB	85	25
6 *	114	ISW	T/S	GP/UB	80	25
7 *	34	ISW	T	GP/UB	80	20
8*	232	GS/CT	T/S	GP/UB	70	50
9 *	67	ST	T	GP/UB	95	15
10	28	CT/SS	T	GP	85	65
11	61	CT/SS	S	GP	85	65
12	14	CT/SS	S	GP	85	65
13 *	20	ST	T	GP/UB	85	15
14	51	GS/CT	T/S	GP/UB	75	55
15	6	ISW	T	UB	95	35
16	34	ISW	T/S	GP/UB	85	15
17	9	ISW	T	UB	85	35
19	67	ISW	T	GP/UB	85	25
20	26	GS/CT	T	GP	85	25
21	20	GIRDLING	N/A	N/A	25	20
22	30	IC	S	UB	80	25
23	63	CT/SS	T	UB	70	50
24	12	ISW	S	GP/UB	95	25
26	34	IC	H	GP/UB	75	30
27	176	IC	H	UB	75	30
28	114	IC	H	UB	75	50
29	29	IC	H	UB	75	40
30	507	IC	H	UB	65	40
31	22	GS/CT	H	GP/UB	40	30
32	83	GS/CT	H	UB	40	30
43	23	GIRDLING	N/A	N/A	15	10
48	324	CT/SS	S/T	GP	95	75
51	13	GIRDLING	N/A	N/A	15	10
52	29	GIRDLING	N/A	N/A	15/	10
53	20	ST	T	GP/UB	90	15
54	38	GIRDLING	N/A	N/A	15	10
55	13	GIRDLING	N/A	N/A	15	10
59	46	CT/SS	S	UB	70	50
60	133	ISW	H	UB	95	20
122	256	CT/SS	T	UB/WLF	20	15
129	86	CTSS	T	GP	95	80
140	128	ISW	H/S/T	GP/UB	65	35
Ecosystem Burn	238	UB	N/A	N/A	20	10
Total	3310					

The proposed openings that will exceed 40 acres (Units 6, 7, 9, 19, 33, 38, 41, 57, 58, 60, 61, 66, 69, 111, 112, 125, 134, and 140) have been incorporated into the watershed, wildlife, fire, and visual analysis. The Bonners Ferry Ranger District is proposing these openings as they are an integral part to ecosystem restoration in the project area. The district has received Regional Forester approval to exceed the 40-acre limit, as stated in the Forest Service Handbook (project file letter dated May 11, 2004.)

Abbreviations used in Treatments table:

Rx = Silvicultural prescription	GS = Group Selection
PCC = Percent canopy closure	IC = Improvement Cut
CT = Commercial thin	GS = Group selection
SS = Sanitation Salvage	T = Tractor
ISW = Irregular Shelterwood	S = Skyline (Cable)
ST = Seed Tree	H = Helicopter
GP = grapple pile	UB = underburn

Table 2-12 Silvicultural Treatment Summary – Alternative 4

Treatment – Commercial Thin & Sanitation Salvage (CT/SS)			
1 2 10 11 12 23 48 59 122 129	37 12 28 61 14 63 324 46 256 86 Total 928	Generally, these are 70-90 year old mixed conifer stands. The primary overstory species is Douglas-fir, with lesser amounts of lodgepole pine and larch. Grand fir, cedar, and hemlock are generally minor components. These stands are overstocked, and growth is declining. Root disease centers are usually less than two acres.	A combination of commercial thinning and sanitation-salvage would be prescribed to maintain the health and vigor of these stands. Generally, the larger-diameter trees with full live crowns would be retained. Poor quality smaller trees would be targeted for removal. These would mostly be suppressed trees with very little live crown. Dead and dying trees not needed to meet snag management requirements would also be removed.
Treatment – Group Selection (GS/CT)			
8 14 20 31 32	232 51 26 22 83 Total 415	These are low elevation (less than 4000 feet above msl) stands in a rural urban interface setting. Overstory species such as ponderosa pine, Douglas-fir and larch are common. In many places the Douglas-fir component is infested with dwarf mistletoe and root disease. Understory trees are composed of thickets of Douglas-fir and grand fir which have formed ladder fuels.	In order to protect the stands from crown fire and restore the historical stand structure, group selection cuts from one to five acres in size would be used to used to create a mosaic of forested openings and thinned areas. These openings will often encompass root disease centers in areas of susceptible Douglas-fir, allowing the area to be reforested with relatively root disease resistant seral species such as ponderosa pine, larch or white pine. Large diameter ponderosa pine, larch, and Douglas-fir relic trees and snags will be left in the group selection openings for future stand structure, snags and a genetic seed banks. Commercial thinning and sanitation-salvage harvesting would be carried out between the group selection openings to maintain the health and vigor of these trees. Generally, the larger-diameter trees with full live crowns would be retained. Trees that are of poor form or suppressed would be targeted for removal. Dead and dying trees not needed to meet snag management requirements would also be removed.

Treatment – Improvement Cut (IC)			
3 4 22 26 27 28 29 30	9 52 30 34 176 114 29 507 Total 951	These are dry forest stands that contain large-diameter ponderosa pine, Douglas-fir, and a few western larch. Portions of these units are classified as dry site old growth. The understory is primarily small-diameter thickets of Douglas-fir.	The objective is to improve, and maintain the development of the larger-diameter ponderosa pine and larch as future old growth and restore old growth characteristics to the dry site stands. Smaller diameter Douglas-fir and grand fir that have invaded the stand in the absence of fire would be removed and unit would be underburned. In order to maintain the old growth attributes of the stands, they will be underburned every 10 to 25 years as appropriate.
Treatment – Irregular Shelterwood Cut ISW)			
6 7 15 16 17 19 24 60 140	114 34 6 34 9 67 12 133 128 Total 536	These stands have thick overcrowded overstories, dominated by lodgepole, larch, and Douglas-fir. The larch, lodgepole, and white pine component of the stands are declining in health and are being replaced by cedar, grand fir and hemlock. In the case of white pine, blister rust has nearly eliminated this species. The understories in these units are nearly impenetrable thickets composed of grand fir, cedar, and hemlock. * In Units 6 and 7, the overstory is predominately “off-site” ponderosa pine that is not genetically adapted to the local area. Most of the ponderosa pine is currently dead or dying from bark beetles. Consequentially, the bark beetle population is increasing and spreading to adjacent stands native ponderosa pine.	The objective would be to favor the development of larch and white pine. Generally, the larger-diameter trees with full live crowns would be retained for seed, shelter and future snags for the new stand. Dead and dying trees not needed to meet snag management requirements would be removed. The logging slash and undesirable understory trees would be burned using grapple piling and underburning where appropriate. Units would be reforested with ponderosa pine, larch and white pine where appropriate.

Table 2-12 continues on the following page.

Table 2-12 continued

Treatment -- Seed Tree (ST)			
9 13 53	67 20 20 Total 107	These are over mature stands that are dominated by lodgepole Pine, Douglas-fir, grand fir, cedar, and hemlock. The larch, lodgepole pine and white pine component of the stand are declining in health and are being replaced by cedar, grand fir and hemlock. In the case of white pine, blister rust has nearly eliminated this species. In Units 9 and 13, the overstory is predominately “off-site” ponderosa pine that is not genetically adapted to the local area. Most of the ponderosa pine is currently dead or dying from bark beetles. Now the bark beetle population is increasing and spreading to adjacent stands native ponderosa pine.	he objective would be to regenerate ponderosa pine, white pine and larch as appropriate. Focus would be on the removal of the smaller diameter Douglas-fir and grand fir. Generally, the larger-diameter trees with full live crowns would be retained for seed, shelter and future snags for the new stand. Dead and dying trees not needed to meet snag management requirements would be removed. The logging slash and undesirable understory trees would be burned using grapple piling and underburning where appropriate. Units would be reforested with ponderosa pine, western larch and white pine.
Treatment -- Girdling			
21 43 51 52 54 55	20 23 13 29 38 13 Total 136	These units were regenerated within the past ten to fifteen years using the shelterwood harvest method. A typical stand would have less than 20 large-diameter trees per acre remaining that were originally left for seed and shade. Regeneration has been established and certified.	The overstory trees in and around the plantations, with mistletoe infections (larch or Douglas-fir) would be girdled to kill the mistletoe and alleviate the potential spread to the healthy understory trees. The girdled trees would be left as wildlife trees, depending on the snag quota in the unit.

2.8 Common Features, Required Design Criteria, and Estimated Effectiveness for All Action Alternatives

The following specific criteria must be applied during implementation of any action alternative or other activities associated with this project. The purpose of these measures is to avoid, or to the fullest extent possible, minimize the potential for adverse effects to the resources discussed below. The effects analysis assumes their implementation. Many of these criteria are addressed through language in the timber sale contracts; the Sale Administrator monitors them for compliance.

A.1 Items included through standard timber sale contract clauses.
Additional information on these criteria is included in the project file and is available by request.

a) Cultural Resources
Assure protection of any encountered historic or pre-historic cultural sites including caves, buildings, objects, and properties. This includes caves, sinkholes, vertical shafts, and related features protected by the Federal Cave Resources Act of 1988.

Estimated Effectiveness – High. Contract provisions for protection of cultural resources are utilized in all contracts and have been effective in protecting cultural resources. (2000 Forest Plan Monitoring Report, Summary of Findings, page 2)

b) Improvements and Survey Monuments
Survey monuments, landlines, and all other improvements will be protected by buffering, appropriate clauses in the timber sale contract, or both.

Estimated Effectiveness – High. Contract provisions for protection of improvements are utilized in all contracts and have been effective in protecting these features.

c) Habitat of Threatened, Endangered, or Sensitive Species
Location of areas needing special measures for protection of plants or animals listed as TES are shown on the Timber Sale Map(s) and identified on the ground. Measures to protect such areas are included in the contract as applicable, this can include restrictions on timing of activities to minimize or avoid impacts to some species.

Estimated Effectiveness – High. Contract provisions for protection of TES habitats and locations are utilized in all contracts and have been effective in protecting these resources (See Forest Plan Monitoring and Evaluation reports).

d) Hazardous Materials
Oil and oil product storage totaling more than 1,320 gallons or a single container with capacity greater than 660 gallons must be stored in a manner consistent with regulations in 40CFR112 and INFS requirements. Storage sites must be designated prior to operations and will meet specifications to minimize potential for hazardous spills and infiltration into soils or delivery to streams, if a spill does occur. Proper notification must occur if any leak or spill enters live water. A petroleum and chemical products spill protection plan would be required and shall meet applicable EPA requirements.

Estimated Effectiveness – High. Contract provisions for storage and use of hazardous materials are utilized in contracts and have been effective in protecting natural resources.

e) Sanitation and Servicing
The timber sale purchaser shall take all reasonable precautions to prevent pollution of air and water by purchaser's operations.

Any changing of hoses, parts, or refueling would be conducted 300 feet away from streams and tributaries. A pre-operational inspection would be conducted by the Forest Service contract inspector for signs of leakage on machines that would be used to reconstruct stream crossings. The inspector and operator would inspect hoses daily for signs of wear. In the event any leakage or spillage enters any stream or open water, the operator would immediately notify the Contracting Officer Representative (COR) or the timber sale administrator who would be required to follow the actions to be taken in case of hazardous spill, as outlined in the spill protection plan. A possible effect would be the damage to water quality should a leak of petroleum products or hydraulic fluid occurs. As long as these requirements are followed, impacts to downstream water quality, fish habitat and aquatic organisms, or any of these individual resources, from contaminants are not likely.

Estimated Effectiveness – High. Contract provisions for sanitation and servicing are utilized in contracts and have been effective in protecting air and water resources.

f) Best Management Practices

Implement site-specific Soil and Water Conservation Practices as listed in Appendix C of this document. These BMPs for units, roads, and landings are designed to meet or surpass the Clean Water Standards Act and the level of Idaho State Best Management Practices for watershed protection (based on Forest Plan Monitoring, a review by Seyedbagheri (1996) and the other references cited in this document, and the site-specific knowledge and professional judgment of the district hydrologist).

Estimated Effectiveness – Moderate to high; depending on the practice. A description of each practice and an estimate of its effectiveness are located in Appendix C. 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. The North Zone aquatics staff would also do periodic monitoring to assess the effectiveness of these practices.

g) Public Health and Safety Features:

1. Dust Abatement -- Dust Abatement used on Forest Service roads consists of road surface preparation and application of water or other materials. . Use of materials other than water will require approval of the Forest Service, shall meet specifications provided in the timber sale contract, and follow manufacturers recommendations for application.

Magnesium chloride or calcium chloride would only be applied under the following conditions to prevent delivery to stream channels:
- Only the road prism would be treated, not the ditch line.
- These products would not be applied during rainstorms or when storms are forecast within 24 hours.

Estimated Effectiveness – High. Contract provisions for dust abatement applications are utilized in contracts and have been effective in protecting natural resources.

2. Traffic Signing -- During logging activities signs would be posted to inform the public of log truck traffic.

Estimated Effectiveness – High. Contract provisions for traffic signing are utilized in contracts and have been effective in protecting public safety.

h) Noxious Weed Measures

1. Washing Equipment -- In order to prevent the spread of noxious weeds into the Sale Area, the purchaser shall clean all off-road logging and construction equipment prior to entry onto the Sale Area to ensure that off-road equipment is free of noxious weeds. In addition, after operating in areas of known weed infestations, any off-road equipment to be transported to those portions of the project area considered to be relatively weed free must be cleaned before entry into those areas. A map of weed-infested and relatively weed-free areas would be included in the timber sale contract package.

2. Construction Sites -- Gravel or borrow pits to be used during road maintenance would be inspected by the District Noxious Weed Coordinator for infestations of new weed invader species. As appropriate, the purchaser would treat any new weed invader species and clean equipment as necessary. A list of weed species defined by the IPNF Weed Specialist as potential new invaders is included in the project file.

3. Haul Routes -- Prior to ground-disturbing activities, where feasible the purchaser of any timber sale contract shall treat with herbicides all travelways, shoulders and turnouts of Forest Service roads being used for hauling. 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 following treatment season.

4. Sites of New Construction – Newly constructed roads, skid trails, landings or other areas of disturbance (including ground-disturbing maintenance on existing roads) would be seeded with a weed-free seed mix of native and desired non-native species and fertilized as necessary.

5. Use of Certified Weed-Free Materials – Straw or hay used for mulching or watershed restoration activities will be certified "Weed Free."

6. Decommissioned or Stored Roads -- Road segments proposed for decommissioning or storage and identified as needing treatment for weeds will be treated prior to those activities.

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 2001). Estimated effectiveness is based in part on results of weed monitoring in recent timber sales where such measures were implemented (see project file).

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 that are confined to road rights-of-way, estimated effectiveness is moderate; the measures are expected to be somewhat effective at reducing the spread of these in the project area. Effectiveness of the above measures on existing weed infestations that have spread off the road right-of-way into the surrounding forest is expected to be low. If funding is available, biological control agents would be released in off-road infestations.

Effectiveness of treatments on National Forest lands could be reduced if adjacent landowners do not treat their weed infestations. Existing weeds and new invaders are also spread by wildlife, winds, water and hikers – the mitigation measures would have no effect on these sources of weed spread.

i) Road Reconstruction and Maintenance

A road package for improvement, construction, reconstruction, and maintenance will include the site-specific BMP criteria listed in Appendix C to be applied during project implementation.

All slash would be removed from road ditch lines according to contract specifications.

Estimated Effectiveness – High to Moderate. See the discussion on Best Management Practices for more information.

j) Soils

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 ensure that the soil quality standards listed in the Forest Plan and Regional Soil Quality Standards would be met. Best Management Practices (BMPs) related to soil and sediment processes also apply and are outlined in "Features Designed to Protect Water and Aquatic Habitat" and Appendix E.

Ground-based Yarding:

- Where present, existing skid trails would be used.
- All new skid trails would be designated and approved prior to harvesting to take advantage of topography and minimize disruption of natural drainage patterns.
- Where terrain is conducive, trails would be spaced at least 100 feet or more apart except where the trails converge.
- The use of a slash mat is recommended.
- Excavated skid trails will be obliterated, re-contoured, and covered with debris by the purchaser following completion of logging activities.
- All skid trails will be seeded and fertilized with the latest seed mix recommended at time of implementation.

***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 (Adams 1997; Niehoff 2002).

Protection of soils within specific stands - Existing skid trails and slash mats will be used in Unit 16 to reduce additional impacts from harvest and site preparation activities.

***Estimated Effectiveness*:** High - past Forest Plan monitoring reports and literature (Han 2005; USDA 1998, 1999, 2000, and 2001) indicate little to no detrimental soil compaction and displacement with these requirements.

Protection during Winter Logging Activities – One **<u>or</u>** more of the following requirements apply on all acres of winter ground-based logging:

- Operate on a 24-inch snow layer or 18 inches of settled snow.
- Require frozen ground to a depth of 4 inches.
- Restrict equipment operation to skid trails or where adequate slash matting exists.

Units 38, 57, and 62 would be harvested under winter conditions. Alternatively, a skyline system could be used during any season because of its low impacts to the soil resource.
Estimated Effectiveness: High - past Forest Plan monitoring reports and literature (USDA Forest Service 2001, 2002 and 2003; Flatten 2003; Philipek 1985) indicate little to no detrimental soil compaction and displacement with these requirements.

Skyline Yarding - The leading end of logs would be suspended during yarding. Yarding across any designated RHCA would require full suspension. Designated corridors are required.
Estimated Effectiveness: High - the intent is to reduce the potential detrimental soil impacts of displacement and compaction. Past Forest Plan monitoring (Niehoff 2002; USDA Forest Service 2004) indicates low amounts of soil compaction and displacement with skyline yarding systems.

Net-improvement of Soils – Unit 16 currently exceeds soil quality standards because of past harvest impacts. The timber sale contract would require the purchaser to rehabilitate the skid trails / rutting and, thereby, move toward a net improvement in soil quality. This would be accomplished through decompaction, addition of organic matter, seeding, and weed control.
Estimated Effectiveness: Low to moderate - Decompaction would provide for improvements in hydrologic function and would initiate a recovery process that otherwise may be prolonged as soil compaction from past and proposed harvest activity persist (Froehlich 1984; Froehlich and Miles 1984; Heninger et al. 2002; Luce 1997; USDA Forest Service unpublished report 2005).

Protection During Grapple Piling, Excavator Piling, or Mechanical Harvest Activities –Grapple piling, excavator piling, and ground-based yarding or harvester equipment would operate on a slash mat and existing skid trails on slopes under 35%.
Estimated Effectiveness: High - past Forest Plan monitoring and research (Han 2005; USDA Forest Service 2001, 2002, and 2003; Niehoff 2002) indicates little to no soil disturbance if equipment is operated on a slash mat.

Service Landings - All landings will be located on system roads or in existing landings. Appropriate BMPs would be in place to prevent or reduce the amount of pollution generated from non-point sources. Weed treatment of sites would take place prior to logging activities. All other weed mitigation measures and prevention practices would occur in accordance with the requirements of the Bonners Ferry Noxious Weed EIS (1998). Following completion of harvest operations, all exposed soils will be seeded and fertilized.
Estimated Effectiveness: High – locating landings on existing classified National Forest system roads that are considered designated lands eliminates additional impacts to activity units. BMPs are very effective in reducing non-point source pollution from silvicultural activities (Lynch and Corbett 1998 and 1999). Effectiveness of weed mitigation practices are described in "Features Designed to Prevent the Spread of Noxious Weeds".

Firelines would be waterbarred, as needed, with a maximum 50-foot spacing to minimize the potential for erosion and concentration of water.
Estimated Effectiveness – High. Forest Plan Monitoring has shown that use of the above measures result in less impact to the soils in managed areas.

k) Watershed and Fisheries

No cutting would be conducted within Riparian Habitat Conservation Areas (RHCAs) as specified in BMP 14.03 listed in Appendix C. These practices comply with the standards and guidelines in INFS. All action alternatives include stream protection zones that meet or surpass INFS requirements. Stream protection zones (Streamside Management Zones) have been shown to be effective in moderating cumulative watershed effects (Belt et. al., 1992).

Estimated Effectiveness -- High to Moderate. See the discussion on Best Management Practices for more information.

A.2 Criteria not included in timber sale and road construction contracts.

a) Noxious Weeds

Any priority weed species (as defined by the IPNF 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.
Treatment would be conducted according to the Bonners Ferry Noxious Weed Control Project FEIS and Record of Decision (USDA 1995).

Estimated Effectiveness -- 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. For existing infestations generally confined to road prisms, 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. Estimated effectiveness is expected to be low in portions of the project area where existing infestations are already established in natural openings away from existing and proposed roads. Estimated effectiveness is based on results of weed monitoring in recent timber sales where such measures were implemented (see project file).

b) Threatened, Endangered, and Sensitive Plants

Currently documented TES plant occurrences in the project area would be buffered from all harvest-related activities. No skid trails, skyline corridors, timber harvest, fuels treatment, planting or thinning would occur within 100 feet slope distance of any known TES plant occurrence.

- Additional TES plant surveys would be conducted as needed prior to weed treatment activities.
- Any changes to the selected alternative that may occur during layout would be reviewed, and TES plant surveys 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 a minimum 100-foot slope distance around documented occurrences
- Modifying harvest methods, fuels treatment or logging systems to protect TES plants and their habitat
- Implementing, if necessary, Timber Sale Contract provisions for Protection of Endangered Species, and Settlement for Environmental Cancellation.

Estimated Effectiveness: High; the measures would protect documented populations of Mingan moonwort (*B. minganense*) and triangle moonwort (*B. lanceolatum*). The above measures would also assure protection of any newly documented occurrences. Protection of 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 1998) and Skin (USDA 1997).

c) Public Health and Safety

For local air quality reasons, restrictions on prescribed burning may be implemented by the Bonners Ferry Ranger District in addition to those imposed by the North Idaho and Montana Airshed Groups.

Estimated Effectiveness: High. The Idaho Division of Environmental Quality recognizes the North Idaho Smoke Management Memorandum of Agreement (1990) as the best available control technology for prescribed burning. This mitigation has a high degree of effectiveness to keep air pollution from smoke at acceptable levels and ensure that air quality standards would be met.

d) Soils

Temporary Road Construction - An engineer or hydrologist would review locations of all roads longer than 300 feet prior to construction. When applicable, temporary road construction proposed would utilize the existing roadbed and would return the road to no less than the present conditions after harvest activities are concluded. In areas were current improvements would be advantageous (i.e. minor slumping where culverts have been pulled), the road would be further stabilized to reduce adverse effects.
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, use of best management practices, and compliance monitoring by the sale administrator or engineering representative (Lynch and Corbett 1990; USDA Forest Service 1999c).

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

- Conventional removal (lop and scatter) rather than whole-tree removal would be practiced. The “lop and scatter” technique would be used during intermediate (thinning) as well as final harvest (regeneration) operations.
- Slash would remain on site over-winter so that mobile nutrients such as potassium can leach from fine materials back to the soil.
- Broadcast burn or underburns would be “light” in nature.
- Tree species suitable to the site would be planted.

Estimated Effectiveness: High to moderate - these practices are based on research and Intermountain Forest Tree Nutrition Cooperative recommendations (Baker 1989; Barber and Van Lear 1984; Edmonds 1987; Garrison and Moore 1998; Laskowski et al. 1995; Moore et al. 2004; Palviainen et al. 2004).

Retention of Coarse Woody Debris - Management of coarse woody debris and organic matter in all units would follow the USFS Region 1 guidelines described below in coarse woody debris requirements.

In units where presently existing coarse material is not sufficient, project activities would provide enough dispersed dead and downed coarse material to meet the guidelines. Additional attention will be given to the whole-tree yarded Unit 12 and the approximately 40 acres along the Forest Service boundary to private land (affecting Units 28, 30, 31, and 32) to meet or exceed recommended guidelines in Graham et al. (1994).

Estimated Effectiveness: High - based on research (Graham et al. 1994, Brown et al. 2003) and Forest Plan Monitoring Reports (USDA 1998, 1999, and 2000), effectiveness is high when guidelines are used; implementation has been moderately successful.

Coarse woody debris requirements (Graham et al. 1994).

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

Protection During Prescribed Burning Activities - Prescribed underburning, pile burning, and ecosystem burning would take place only when the upper surface inch of mineral soil has a soil moisture content of 25 percent when soil moisture would not result in a severe burn that could produce hydrophobic soils or eliminate the entire soil duff layer.
Estimated Effectiveness: High - this practice is effective in retaining decomposing forest floor litter and organic matter to retain nutrients and soil productivity potential (Niehoff 1985; Niehoff 2002; USDA Forest Service 2001, 2002 and 2003).

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. Burn piles should be small and numerous rather than large and few.
Estimated Effectiveness: High - this practice is based on research and Intermountain Forest Tree Nutrition Cooperative recommendations (Baker 1989; Barber and Van Lear 1984; Edmonds 1987; Garrison and Moore 1998; Laskowski et al. 1998; Moore et al. 2004; Palviainen et al. 2003).

Protection of Soils from Weed Infestation - Weed mitigation measures and prevention practices would occur in accordance with the requirements of the Bonners Ferry Noxious Weed EIS for all landings, helicopter pads, and road disturbances.
Estimated Effectiveness: Moderate to High – 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 (Drlik et al. 1998; Sheley et al. 2002; USDA FS 2001a). Effectiveness of weed mitigation practices are described in more detail in "Features Designed to Prevent the Spread of Noxious Weeds".

e) Timber Harvesting

A variety of ground-based, cable, and aerial yarding systems are used. The system chosen was based on a variety of factors including, but not limited to, resource protection, economics, and current and future access needs. Any on-site changes in logging systems would be made to protect resources.

As determined through monitoring, mechanical fellers would only be allowed off skid trails if they travel on snow, frozen ground, or a slash mat (to prevent detrimental impacts that would exceed Region 1 standards). See actual specifications in the previous Soils discussion (section 2.8-A.1-j).

Tops would not be yarded, except in portions of helicopter units 30, 31, and 32 adjacent to private land where they will be yarded to reduce the buildup of slash and fuel loading. Portions of the western edges of these units are anticipated to have high fuel loadings that could need to be reduced as feasible to aid in controlling a wildfire or prescribed fire. Enough slash and woody debris would be left on-site to meet coarse woody debris / nutrient cycling guidelines as stated in the Soils discussion.

A Forest Service representative on logging operations would conduct a pre-work conference. Special conditions of the contract would be reviewed in advance (Garten 1991). The purpose of this measure is to make sure that resource protection objectives

are clearly communicated and understood by all parties responsible for project implementation. When logging operations are active, they will be monitored, at least once a week, by the Forest Service Sale Administrator. Other resource specialists also monitor sale activities as described in the Watershed and Fisheries, Noxious Weed, and TES Plants design criteria.

Estimated Effectiveness – High. Timber Sale Contract provisions for these resources have been effective in protecting natural resources. See Section 2.6 subpart A for description of standard contract items.

f) Slash Disposal

A variety of slash disposal methods would be utilized (underburning, grapple piling, and lop and scatter.) Optimally, the slash, except for landing slash would be allowed to cure for at least six months, prior to any mechanical disposal activities, to allow enough time for the bulk of nutrients to leach from the foliage into the soil (Bruna 1994). The decision to use a particular method would be based on individual stand objectives.

All landing slash and any scattered grapple piles would be burned after completion of all sale-related activities to reduce the risk of accidental ignition during dry periods of the year. They would be burned in the late fall when the risk of escape into adjoining stands and damage to the residual timber is reduced.

Estimated Effectiveness – High. The Bonners Ferry Ranger District conducts the slash disposal and prescribed burning for timber sales. Specifications regarding timing of these activities are included in slash disposal and Prescribed Burn Plans. Past monitoring and research have shown these measures are effective in protecting soil productivity.

g) Vegetation

Weed and release, underburning, or slashing treatments would be used in specific units to reduce stocking levels of existing regeneration. Regeneration units would be planted with seral species that are adapted to local site conditions. All regeneration units will be successfully regenerated within five years.

A.3 Watershed and Fisheries Features

The following features consist of project designs or mitigation measures that are applicable to Alternatives 2 and 4. They are listed here separately only to avoid repeating them in each alternative description. Items described under “Features Related To…” are simply additional project designs common to the alternatives. Items described under “Features Designed to…” are protection or mitigation measures proposed to minimize, eliminate, avoid, rectify, or compensate for potential negative effects of proposed activities. Where mitigation measures are listed, the effectiveness of the measure is estimated.

a) Features Designed to Reduce Effects From Temporary Roads (protection or mitigation features)

<u>Road Design</u> - To avoid potential resource damage from temporary roads that may remain on the landscape until post-sale activities are completed (possibly five to eight years), new temporary roads generally greater than 300 feet in length would be designed by a Forest Service Engineer and would be incorporated into a road package tied to the timber sale. (This distance could be increased if ground conditions are such that resource damage would be minimal.) An engineering representative would monitor new temporary road construction to ensure design specifications were met. At the end of all project activities, all temporary roads would be decommissioned and removed from the forest transportation system. See “Features Designed to Reduce Sediment” and “Features Designed to Protect Water and Fish Habitat” for specific mitigation.

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 1999c), road drainage (Haupt 1959, Copstead 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).

b) Features Designed to Reduce Sediment (protection or mitigation features)

<u>Temporary and Classified Road Decommissioning to Improve Aquatic Habitat</u> – All temporary and classified roads identified for decommissioning or storage would be obliterated with appropriate techniques. These may include full and partial

recontouring; removing all culverts; stabilizing fill slopes and restoring stream channel crossing back to natural grade. Seeding, fertilizing, and placement of woody debris would follow to establish desired vegetation and prevent noxious weed spread.

- Roads 397-Y, 397-XUC, 397-XUD will be decommissioned after use under all action alternatives.
- Road 2217-C, approximately one-half mile will be decommissioned after use under all action alternatives.
- Road 2211-US, decommission under Alternative 2 only; not included in Alternative 3 or 4.
- Road 2481-H, place in storage under Alternatives 2 and 3; not included in Alternative 4.

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 delivering large quantities of sediment (USDA 2000 and 1999).

Hydro-mulching - All road construction would require hydro-mulching on soil disturbance sites within critical areas such as wet areas or stream crossings, and large cut and fill slopes. Mulching would occur immediately after road construction is completed.

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

c) Features Related to Timing of Activities (project features)

Timing of Road Decommissioning – Unless circumstances change during implementation that would extend the duration of time a road is needed, roads would be decommissioned within the following timeframes:
a) Temporary roads or existing road segments proposed for decommissioning that are not needed for post-cutting activities (e.g. fuel treatment or planting) would be decommissioned the same season following cutting activities or no later than the following season.
b) Other road segments proposed for decommissioning that are needed for post-cutting activities, such as prescribed burning or planting, would be decommissioned within two to five years of cutting activities.

d) Features Designed to Protect Soil, Water and Fish Habitat (protection or mitigation features)

Best Management Practices - All activities would be designed to protect water quality and fisheries habitat. Best Management Practices (BMPs) are the primary mechanism to enable the achievement of 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. Site-specific best management practices that have been specifically designed for these alternatives and are part of the design criteria are described more fully in Appendix C.

Estimated Effectiveness - Moderate to high; depending on the practice. A description of each practice and an estimate of its effectiveness are located in Appendix C. 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 (see Section 2.6 subpart A for discussion of timber sale provisions.) The Forest Service Timber Sale Administrator would frequently review the project for compliance with these and other timber sale requirements. The North Zone aquatics staff would also do periodic monitoring to assess the effectiveness of these practices.

Sediment Reduction - Spot gravelling with approximately 6 inches of gravel would be required at all stream crossings, rolling dips, and in any wet areas.

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

Inland Native Fish Strategy – Commercial timber cutting would be prohibited in RHCAs for fish habitat protection using the guidelines established by the Inland Native Fish Strategy (INFS). These no-harvest zones include 300-foot (slope distance) protection zones for perennial fish-bearing streams, a 150-foot protection zone for perennial non-fish bearing streams, a 100-foot protection zone for ponds, lakes, reservoirs, and wetlands greater than one acre, and a 50-foot protection zone for intermittent streams and sensitive landtypes since Mission Creek and Brush Creek are not priority watersheds. 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 prevent scouring or head cutting.

Some hazard tree removal may occur within the Brush Lake Campground area for public safety. The campground currently exists within the RHCA. This is consistent with INFS direction (USDA 1995; Appendix A, RA-2).

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

Protection Of Wetlands, Seeps, Bogs, Wallows and Springs – All known or discovered wetlands, seeps, bogs, elk wallows and springs less than one acre in size would be protected with a "no activity" buffer approximately 100 feet in diameter.

Estimated Effectiveness: High; this practice would be implemented because it would be incorporated into project design and unit layout, and implemented by the sale administrator.

Road Surface and Drainage Crossing Maintenance to Improve Aquatic Habitat - The main source of erosion and sediment delivery from roads is usually from the road surface. Road maintenance activities that focus on reducing sediment delivery 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. These activities would help improve road surface drainage and decrease sediment delivery to stream channels.

Road drainage crossings that pose a hazard and risk to aquatic species and their habitat from sediment delivery have been evaluated throughout the project area. Recommendations for each crossing may include replacing, redesigning or upgrading crossings as needed. Some specific road improvements to reduce sediment risks include:

Road 272 - In Alternatives 2 and 3, road drainage crossings would be redesigned and ditch drainage would be improved to avoid stream diversion potential and culvert failure. The first mile of road will be resurfaced with asphalt. The road will be resurfaced with gravel from MM3 to the East Fork bridge. An 18” culvert would be replaced with a 32” CMP to improve an ephemeral draw crossing and reduce risk of culvert failure at MM 3.0. Cutslope stabilization would occur at approximately the one mile. Only basic maintenance would be conducted on 272 in Alternative 4.

Road 272A – In Alternatives 2 and 3, the first one half mile of 272-A would be resurfaced and regraded due to existing gullying down the road. An 18” culvert would be replaced with a 24” at MM 0.8. This upgrade is not included in Alternative 4.

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 (see Section 2.6 subpart A for discussion of timber sale contract provisions.)

Protection of Fish When Using Streams For Prescribed Burning Control - To avoid adverse effects to fish and redds while using natural water sources, water removal may not exceed 90 gallons per minute and pumping sites would be located away from spawning gravels. The intake hose would be screened to prevent accidental intake of small fish. An emergency spill clean up kit would be on site in the unlikely event of a fuel spill outside the containment system. This is consistent with INFS direction (USDA 1995; Appendix A, RA-5).

Estimated Effectiveness: High; a description of each applicable INFS standard and guideline and its estimated effectiveness may be found in Appendix C – Best Management Practices. These requirements would be implemented since they are incorporated into project design.

A.4 Wildlife Habitat Features (protection or mitigation features)

Northern gray wolf – Any gray wolf den or rendezvous sites identified in or adjacent to proposed activity areas will be spatially or temporally buffered, or both, as appropriate. This would include:

- No project activities within one (1) mile of occupied sites from April 1-July 1 for den sites and from July 1-August 15 for rendezvous sites.

Upon review by the Forest Level 1 team, these distances could decrease based on topographical characteristics at each site.

Wildlife Tree Retention – Design features for the project were developed to ensure the retention and selection of snags at a level and distribution that have been shown to support viable populations of species that use them.

Snags and live tree replacements would be retained where opportunities exist in treatment units at levels recommended by scientific literature based on recent studies (Bull et al. 1997). 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). The following minimum amounts of snags and live tree replacements are to be retained within applicable cutting areas:

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

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.

Selection of snags and live tree replacements would emphasize practices that assure the highest probability for long-term retention (Bull, et al. 1997). 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 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.

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 (see Section 2.6 subpart A for discussion of timber sale 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 willfully 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 monitoring has demonstrated that tree harvesting and subsequent burning removes a large portion of existing snags, especially the “soft snags.” However, through the strategic placement of leave patches or clumps, snags within these areas should be relatively protected. In addition, prescribed underburning will recruit “new” snags by fire-killing residual green trees. There would be no problem meeting and exceeding live tree replacement criteria in that vegetative prescriptions are designed to leave ample green trees scattered in patches and individually (regeneration cutting), and uniformly (selective cutting) 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 for safety reasons these species need to be cut 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, nutrients and sunlight.

Estimated Effectiveness: High; this measure has a high potential for being implemented. These measures would be implemented through contract provisions (see Section 2.6 subpart A for discussion of timber sale provisions), and compliance monitoring. Effectiveness is high because regardless of whether hardwood trees remain standing or felled for safety reasons, they remain on site and provide benefits to various wildlife species. Hardwoods, such as aspen and birch, will re-sprout if felled or killed by burning.

Dry Forest Ecosystems – Because there are fewer ponderosa pine trees in the northern Rocky Mountains than were there historically, it is necessary to retain large Douglas-fir trees in addition to the large ponderosa pine trees to achieve suitable habitat conditions for species associated with the drier habitats (e.g. flammulated owls, white-breasted nuthatch, Cassin’s finch). For stands associated with the dry forest ecosystem, design harvest prescriptions to maintain the persistence of a mature ponderosa pine/Douglas-fir community by:

- Retaining an overstory canopy closure of 35-65 percent.
- Achieving a relatively open landscape of ponderosa pine/Douglas-fir that is structurally complex as opposed to a landscape that is structurally simple. Design for non-uniform spacing of trees (moderate within stand variability) with patchy microhabitats of understory trees.
- Retaining a minimum of one patch (~1/10th acre) of densely vegetated understory per 5 acres across all mature dry-site harvest units. Where possible, these patches should be in the vicinity of large residual snags or snag recruits.

Estimated Effectiveness: High; using silvicultural prescriptions, marking guides, contract inspections and appropriate fuel treatment methods, this feature would have a high likelihood of avoiding or reducing adverse effects on flammulated owl habitat. This feature is intended for selective cutting treatments that are designed to advance current stands toward larger, more open forest structure.

Estimated effectiveness is rated high because selective harvesting is a relatively light treatment, leaving a number of management options for the future.

Fuels Treatment – Where treatment units are grapple piled, one slash pile per 2 acres would be left unburned to provide habitat for small forest animals (e.g. snowshoe hares).

Estimated Effectiveness: High

Goshawk Nest Site Protection – Nest searches would be conducted during project layout and implementation. Operations and related activities would be suspended within ~ ½ mile of known or discovered nests between March 15 and August 15 to reduce risk of failure. Timing restrictions for activities can be removed after June 30 if nest site is determined to be inactive or unsuccessful.

Existing and newly discovered nest sites would be protected by a 30-acre, no activity buffer during any contractual operations (Reynolds et al. 1992).

Estimated Effectiveness: Moderate to High; District marking and layout crews have been reliable in reporting new territories and alternate nests of existing territories in the vicinity of activity areas in past sales. The 30-acre no-activity area should provide an adequate post-harvest nest stand for goshawks as long as known nest trees are located near the center of the buffer. Seasonal restrictions are likely to minimize disturbance to active nests, particularly if ground-based systems are being used outside the ½ mile buffer.

Threatened, Endangered, and Sensitive Wildlife Species Management - If any threatened, endangered, or sensitive species were located during project layout or implementation, management activities would be altered, if necessary, so that proper protection measures are taken. Timber sale contract clause B(T)6.25, Protection Of Threatened, Endangered And Sensitive Species, would be included in any timber sale contract. (See Section 2.6 subpart A for discussion of timber sale provisions.)

Estimated Effectiveness: High; using contract provisions, this feature would have a high likelihood of achieving the desired objectives.

Timing of Harvest Operations – Off-road mechanical activities related to this project would not be allowed within the area of historic bear use from April 1 – June 14. Where possible, units in this area would be winter logged. This restriction affects Units 38-48, 54-112, 125, 134 & 135. This measure is designed to minimize disturbance to grizzly bears that make seasonal use of the project area, particularly in spring.

Estimated Effectiveness: Moderate to High; if logging activities take place within the non-denning period from July 1-November 14; High if logging activities take place during the grizzly bear denning period (November 15-May 31).

Bat Roost Site/Hibernaculum Protection – Improve/rebuild berm at entry to Bethlehem Mine Road (FR 397-E) at completion of post-sale activities to reduce potential human impacts to known Townsend's big-eared bat roost site and hibernaculum in the gated mine.

Estimated Effectiveness – moderate; the berm currently in place is ineffective and easily bypassed by low-clearance passenger vehicles. Although a bat-friendly gate restricts human entry to the mine itself, the ease of access to the site allows a relatively high degree of human disturbance at the adit, which may deter bat use. While walk-in access would still be allowed, elimination of vehicular access would considerably reduce possible disturbance to resident bats.

A.5 Recreation Features (protection or mitigation features)

Timing of activities - Limit restoration treatments around Brush Lake to the off-recreation season (winter).
Estimated Effectiveness: High; limiting the log hauling to wintertime and weekdays using timber sale contract measures would minimize contact between winter recreation users and logging truck traffic (see Section 2.6 subpart A for discussion of timber sale provisions),.

Logging slash and the risk of fire near Brush Lake facilities and access roads
Estimated Effectiveness: High; using timber sale contract specifications the slash / fire hazard will be nearly eliminated by trampling the slash in the skid trails and grapple piling (see Section 2.6 subpart A for discussion of timber sale provisions).

Protect Brush Lake facilities trails and any improvements –
Estimated Effectiveness: High; using timber sale contract provisions, any protected improvements such as outbuildings, fire rings and trails are identified on the sale area map and buffered during operations (see Section 2.6 subpart A for discussion of timber sale provisions).

Develop informational signs for Brush Lake to help forest visitors understand the vegetation treatments.
Estimated Effectiveness: High; interpretive signs and trails will explain the fire history of the area, the offsite ponderosa pine plantations, and the need for restoring native trees to the area.

Designate trails/roads open to ATV/motorcycle use throughout the project area. Utilize roads and abandoned roads to make networks where possible. Develop connecting trail spurs when necessary to make a logical network. Implement a full project area closure to cross-country motorized use.

Estimated Effectiveness: High; there is already an informal network of ATV trails scattered around the Brush Lake area and some of them are damaging protected wetlands. The new trail network will be modified to stay out of wetlands and onto skid roads further from Brush Lake. Interpretive signs, maps and boundary markers will delineate the new modified trail network to users. Impacts to sensitive plants, wildlife, archeology and aquatics were discussed by the ID team and found to be negligible because the trails will be located in designated areas away from wetlands and any sensitive areas. In contrast, the current trend for the ATV's is to travel cross country into unregulated areas. Use of ATV's and motorcycles off the designated trails will be prohibited.

2.9 Monitoring

Site-specific monitoring of project activities would be conducted if any of the action alternatives were implemented. This monitoring is designed to verify that the projects are implemented as designed, and are effective in meeting project and Forest Plan objectives.

The IPNF has developed a monitoring plan that fulfills several needs. One aspect of monitoring looks at the degree to which the objectives, standards, and guidelines of the Forest Plan are being implemented. Another reason is to measure the effectiveness of management practices used in site-specific projects. Monitoring is also used to verify the assumptions and models used in planning.

Funding for the monitoring plan may vary; this may lead to assessing priorities as needed to assure the integrity of Forest Plan monitoring and evaluation direction.

The IPNF prepares an annual Monitoring and Evaluation Report to document the results of monitoring conducted across the entire IPNF. Reports are available for public review on the IPNF web at http://www.fs.fed.us/ipnf/eco/manage/forestplan/index.html#fpmon or from IPNF offices. (See the project file)

For activities related to this project, all alternatives would comply with specific monitoring requirements identified by the IPNF Forest Plan.

The length of time needed for monitoring is determined by the results and evaluation of the activity or effect that is being monitored. When it is certain that regulations and standards are being met, monitoring of a particular element would cease. If monitoring evaluations show that regulations or standards are not being achieved at the desired level, management intervention would occur and monitoring would continue.

Monitoring plans are not static; they encompass many activities and administrative processes. The monitoring identified in the Monitoring and Evaluation chapter of the IPNF Forest Plan does not include all of the monitoring done by the Forest. Monitoring to address other laws, policies and site-specific decisions are part of forest-wide monitoring programs.

Predicting the effects from our land management activities also depends on research information. Research findings used for this project are in the List of References at the back of the FEIS.

2.9-A. IPNF Forest Plan Monitoring

The 1987 IPNF Forest Plan identified 22 monitoring items and the time schedules for frequency of monitoring various types of activities. Because of the nature of some of the monitoring items and the diversity of forest management projects, all these items are rarely monitored on any one project. For the Mission Brush project, the following Forest Plan items would be monitored: timber management, wildlife, watershed and fisheries, threatened and endangered plants, soil productivity, and visual quality objectives. The methods used to monitor these are briefly summarized below.

Timber Management

Forest level monitoring to track implementation for the Forest-wide timber management program includes:

- Tracking the status of regeneration on harvested lands to determine if restocking is completed within five years.
- Surveying to determine insect and disease levels and potential for major outbreaks.
- Accumulating and maintaining data on timberland suitability changes recommended by project level planning.
- Accumulating and maintaining data on timber sell levels (actual area and volume sold compared to Forest Plan predicted levels).

Wildlife

Big game management indicator species population trends are determined by using information from the Idaho Department of Fish and Game. Hunter success rates and visual counts of animals are used to determine these population levels.

Northern goshawk nesting sites are currently being monitored. Known nesting sites are being visually inspected to determine occupancy. The monitoring frequency varies based on funding. Surveys are conducted for additional nesting sites during project planning or implementation if nests are sighted.

Threatened, Endangered and Sensitive Plants

IPNF 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 are modified to attain this objective. Sensitive plants are protected according to site-specific management plans developed by the Forest or District Botanists.

Soils

The Region One and IPNF standard is to maintain 85 percent of an activity area in a productive condition for growing trees and other managed vegetation. To assist in meeting this direction, one timber sale per year on each district is monitored. Recommendations stemming from this monitoring and evaluations are made for the project being monitored and for forest wide practices in general.

Water Quality

Forest Plan Appendix JJ established the IPNF water quality monitoring program. The program is the result of a Memorandum of Understanding with the State of Idaho dated September 19, 1988. The agreement also replaced Forest Plan Appendix S (Best Management Practices) with Forest Service Handbook 2509.22 (Soil and Water Conservation Practice Handbook).

According to Appendix JJ of the Forest Plan, in order to demonstrate water quality protection, monitoring plans would address three primary questions focused on Best Management Practices, as follows:
a) Are BMPs implemented as designed?
b) Are the BMPs effective in controlling non-point sources of pollution?
c) Are beneficial uses of water protected?

The following monitoring categories would answer those questions:
Baseline monitoring characterizes existing water quality conditions and long-term trends of stream systems. It also provides a control for monitoring and assessing activities. Throughout the Forest, baseline monitoring sites have been identified and established to serve as representative samples of conditions on the Forest.
Implementation monitoring shows whether or not prescribed BMPs were implemented as designed and in accordance with Forest Plan and project standards and guidelines. In addition to specific project monitoring discussed in this document, supplemental implementation monitoring would include field reviews by interdisciplinary teams using a procedure similar to State audits.

Specific projects to be monitored would be selected based on local issues and BMPs used in the project. Projects involving each type of land management activity and a target of 10 percent of timber sales would be evaluated per year. The primary objective would be to determine if BMPs identified in the Forest Plan and project design were implemented and correctly applied in a timely fashion. During the review, visual observations would be made to see if BMPs and Forest Plan and project standards and guidelines are effective.

BMP monitoring includes a "feed back loop" to ensure the desired results are being attained on the ground. In the event of incorrect or inappropriate application of BMPs, or omission of prescribed BMPs, causes would be identified along with corrective or preventive actions to be taken. Corrective measures would be incorporated into:
modification of and adjustment to contracts;
administrative procedures; and
long-range plans as necessary to ensure BMPs are both properly designed and implemented.

Effectiveness monitoring demonstrates if BMPs were effective in controlling pollutants to meet planned levels or resource management objectives. The intent is to focus on cause and effect relationships between land management activities and water quality. Effectiveness monitoring would be done on a sample basis to characterize typical conditions so that results can be extrapolated. Emphasis would be on major non-point pollution source contributing activities such as road construction, reconstruction, and maintenance; related erosion control BMPs; and riparian area management.

Fisheries

In June 2005 the Forest Plan was amended to remove objectives, standards, and monitoring requirements for fisheries that pertain to fry emergence and relate to maintaining at least 80 percent of fry emergence success in fishery streams. Current fisheries monitoring items include G-2 to validate the R1/R4 model, and a combination of a portion of the core sampling program from item G-1 (fry emergence) and G-3 to validate fish habitat trends identified in the Forest Plan, as well as additional parameters to determine the health of streams. (Forest Plan pp. IV-11, IV-12)

G-2 Fish population trends: The objective is to determine the trend in fish populations for important streams. In conjunction with the Idaho Fish and Game Department, annual surveys are conducted of a subset of streams on the IPNF. The primary focus of these surveys has been westslope cutthroat and bull trout. Some of these surveys are only conducted once, while others have been surveyed multiple years at the same location. Surveys for bull trout have focused on the Priest, Pend Oreille and St. Joe basins. Extensive surveys for cutthroat trout have been conducted in the Coeur d'Alene basin.

G-3 Validate fish habitat trends: The purpose of this monitoring is to evaluate the impacts of forest management activities on fish habitat. Stream surveys are conducted at both the project and forest level. These surveys evaluate pool conditions, habitat complexity, spawning substrates, etc. Some of these surveys are only conducted once, while others have been surveyed multiple years at the same location. In addition, we collect information on substrate size, which can be used as a surrogate for fish habitat quality. Over 400 streams have been surveyed on the IPNF since 1988.

Visual Quality

Decision documents are reviewed annually for Forest Plan visual quality objective compliance. Annually, up to two sales per district may be field reviewed after harvesting has been completed. The objective of the field review is to determine if the Visual Quality Objectives (VQOs) have been met as described by the decision document for that sale. A ten percent departure from Forest Plan direction after five years would initiate further evaluation of the visual resource management program.

Project Level Monitoring

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 ground or project conditions with the wildlife biologist or hydrologist to apply the best practices on the ground. Joint field reviews are taken as needed. These steady informal communications allow for incremental project adjustment throughout implementation to achieve the desired results.

In addition to these less formal monitoring procedures, the following monitoring would be conducted.

Air Quality

When burning residues from timber harvest (slash), smoke management guidelines would be followed as prescribed in the Idaho Smoke Management Memorandum of Agreement (1990), the North Idaho Cooperative Smoke Management Plan (1990), and the Washington State Smoke Management Guidelines. The portion of Idaho north of the Salmon River has been divided into three airsheds. Each airshed has a coordinator responsible for reporting all planned activity to a monitoring unit. The monitoring unit regulates the prescribed burning activities of all participants in the program. The Idaho Division of Environmental Quality recognizes this process as Best Available Control Technology for prescribed burning.

Air quality is monitored by the North Idaho and Montana Airshed Groups during the fall burning season and yearlong by the Idaho Department of Environmental Quality and the Washington Department of Natural Resources. Burning is permitted by these organizations only when air quality, atmospheric conditions and proposed prescribed burning amounts and locations would allow smoke production to comply with the Clean Air Act. Prescribed burn managers (Burn Bosses) also may restrict burning when air quality is judged poor.

Local airshed coordinators are notified annually of all planned fall burning. One day prior to burning, the coordinator is notified that burning is scheduled. Prior to ignition, the burn boss determines if the planned burning is within the smoke management guidelines before making a decision to proceed. If there is a restriction on burning, the restrictions are followed in accordance with direction from the local airshed coordinator. The Airshed Group's restriction procedures enable the Monitoring Unit to reduce burning, stop burning in specific areas, or cease burning entirely when meteorological or existing air quality conditions warrant. (North Idaho Cooperative Smoke Management Plan, July 1990). Restrictions on prescribed burning for local air quality reasons may be implemented in addition to those imposed by the smoke management monitoring unit.

Heritage Resources

Special contract provisions are utilized in all timber sale contracts. These provisions provide for protection of all existing recorded cultural resources. They also require that the contractor promptly notify the Forest Service upon discovery of a previously unidentified cultural resource.

Timber Management

Each active harvest unit would be visited at a frequency necessary to assure compliance with the timber sale contract by a certified timber sale administrator. Minor contract changes or contract modifications would be enacted, when necessary, to meet objectives and standards on the ground.

Water Quality

The Forest Service would monitor the implementation of applicable BMPs and mitigation measures (site specific BMPs). Monitoring would be documented in BMP inspection reports by the district hydrologist. The completed reports are given to the forest hydrologist, who forwards them to the State Bureau of Water Quality on an annual basis.

The timber sale administrator and the engineering contracting officer representative (COR) would assure that timber and road (reconstruction and obliteration) contract specifications are followed. The district hydrologist would also provide technical assistance and review as needed.

Fuels Treatment

The fuels treatment prescriptions and accomplishments are entered into the TSMRS database; also, walk through surveys are normally conducted after the work is completed.

Wildlife

Flammulated owl presence/absence surveys have been conducted on the Bonners Ferry Ranger District for a number of years. The results of the surveys are included in the project file. Nocturnal calling is the technique used to detect flammulated owls. To date, no owls have been detected in the project area through use of this method. The nearest positive result for flammulated owls is on the south aspect of Dawson Ridge in the vicinity of treated dry-site Ponderosa pine and Douglas-fir stands that are similar to the photo of desired future conditions in Chapter 1 (Figure 1-4). Surveys of habitat in the proposed treatments units and non-treated areas will continue as monitoring for this project.

Project Effectiveness Monitoring

Timber Management

Units that are treated with a regeneration harvest would be surveyed by employees of the Timber Stand Improvement section of the district at one, three, and five year intervals following planting to certify regeneration. (Funding for the monitoring is mandated by the Knudtsen-Vandenburg Act in compliance with the National Forest Management Act and is assured through timber sale base rates.)

Water Quality

BMP effectiveness would be monitored following at least one runoff season after BMP implementation. Watershed rehabilitation projects typically are monitored annually or biannually for effectiveness and maintenance needs. Monitoring would be correlated with watershed exams on the sale area through the 5th year after project implementation based on available funding.

Old growth

Verify applications of harvest prescriptions to determine if they are in compliance with measures to protect old-growth integrity to determine if predicted results were achieved (post treatment).

Snag Retention

A sample or portion of treatment units would be surveyed to evaluate the influences of forest management practices on wildlife tree retention practices and determine if predicted or stated objectives were achieved.

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 Bonners Ferry 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.

Access Management

Proposed road obliteration work would be monitored during the implementation phase of the project and following the project to determine the effectiveness of obliteration methods.

Soils

Unit 16 will be monitored post-harvest to assess if mitigation objectives (net improvement in soil conditions) were met.

2.10 Other Restoration Projects and Opportunities

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 Bonners Ferry Noxious Weed Control Project FEIS (USDA 1995).

Wildlife Habitat Improvement Opportunities - The following activity is recognized as a future opportunity and is not a required feature of the Mission Brush project. The conclusion of effects is not dependent upon implementation of this opportunity.

Northern Goshawk Nest Stand Augmentation – Following management recommendations outlined by Reynolds et al. (1991, p. 24), and subject to funding availability, conduct non-commercial thinning of understory vegetation (less than 6” dbh) throughout the excluded portion of Unit #20 during the non-nesting period (September 30 – March 1) to provide long-term suitable nesting habitat in this stand. This portion of Unit 20, while not as densely vegetated as the remaining portion, faces increasing understory congestion from grand fir and Douglas-fir saplings. As stated in Chapter 4 (Wildlife, Northern Goshawk), the nesting pair may have abandoned this stand when the increasing stem density moved it away from suitable

condition. The nest stand enhancement described here would remove understory congestion that may be discouraging current use of the nesting stand, and would retain suitable nesting conditions further into the future than the lack of treatment would.

Net-improvement of soils -- Funding to rehabilitate skid trails created by past activities outside Unit 16 would come from Knudtsen-Vandenberg funds (K-V) or other sources, if available.

2.11 Comparison of Alternatives:

The maps and tables in this section present summaries and comparisons of all alternatives.

Table 2-13 Summary and Comparison of Vegetation, Fuels and Road Treatments

Vegetation Treatment Type	Alt 1	Alt 2	Alt 3	Alt 4
Regeneration Cuts				
Irregular Shelterwood (ISW)	0	1210	971	525
Seed tree (ST)	0	402	370	106
Total acres of Regeneration Cuts	0	1612	1341	631
Partial Cuts				
Commercial Thin / Sanitation Salvage (CT/SS)	0	927	689	928
Improvement Cut (CT)	0	951	890	951
Group Selection / Commercial Thin (GS/CT)	0	388	388	415
Total acres of Partial Cuts	0	2266	1967	2294
Girdling of larch and Douglas-fir with mistletoe	0	136	0	136
Logging Systems				
Ground Based (acres)	0	1213	855	830
Skyline (acres)	0	434	403	111
Helicopter (acres)	0	1306	1255	1098
Combination of Methods (see alternative descriptions in Section 2.5)	0	930	795	896
Fuels Treatments				
Grapple Pile (acres)	0	763	417	764
Underburn (acres)	0	1720	1743	1315
Grapple Pile with follow-up Underburn (acres)	0	1400	1148	857
Ecosystem Burns (total acres) (these areas will be underburned, but not harvested)	0	238	0	238
Transportation System Management				
Temporary Road Construction (Decommission after use)	0	5	0	5
Road Decommissioning (existing roads)	0	13	13	13
Road Improvements	0	39	37	26
Roads placed in Storage	0	5	5	5

Acreages and lengths of road segments are estimates based on field visits, aerial photo interpretation, and GIS/GPS data.

Table 2-14 Proposed Road Treatments -- Mission Creek and Hall Mtn areas
See Figure 2-8 for locations of these roads.

Road	Alternative 2	Alternative 3	Alternative 4
267-FDR	Improve for use; place in storage after use.	Improve for use; place in storage after use.	----------
267-UA	Place in storage at same time as 267-FDR	Place in storage at same time as 267-FDR	----------
267-UB	Place in storage at same time as 267-FDR	Place in storage at same time as 267-FDR	----------
272-FDR	Improve – See footnote #1	Improve – See footnote #1	Maintain – see footnote #2
272-A	Improve – See footnote #3	Improve – See footnote #3	----------
2206-FDR	Improve – See footnote #4	Improve – See footnote #4	----------
2211-FDR	Improve for use; place in storage after use.	----------	----------
2211-UA	Decommission	----------	----------
2217-FDR	Improve portion used as haul route.	Improve portion used as haul route.	Improve portion used as haul route.
2217-C	Decommission last ½ mile	Decommission last ½ mile	Decommission last ½ mile
2219-A	Improve for use	Improve for use	Improve for use
2481-H	Place in storage. See footnote #5	Place in storage. See footnote #5	----------
#1 – Rd 272 Resurface first 1 mile and in area of East Fork bridge. General maintenance. Upgrade culvert near intersection with Road 2481. #2 – Rd 272 Basic maintenance only, upgrade culvert near intersection with Road 2481. #3 – Rd 272-A Improve. Resurface approximately 0.5 miles. Upgrade culvert at MP 0.83. #4 – Rd 2206 Improve; resurface first switchback. #5 – Rd 2481-H Storage. Pull culverts; recontour drainage. Install non-drivable waterbars connected to ditchline. Seed and close with a berm.			

Table 2-15 Proposed Road Treatments -- Brush Lake Area
See Figure 2-9 for locations of these roads.

Road	Alternative 2	Alternative 3	Alternative 4
397-Y	Decommission after use.	Decommission after use.	Decommission after use.
397-E	Construct temp road. Decommission after use.		
397-XUC	Decommission after use.	Decommission after use.	Decommission after use.
397-XUD	Decommission after use.	Decommission after use.	Decommission after use.

Roads displayed on the following maps that are not listed in the table (such as #2209-UE-FDR and 397-UV-FDR) have been analyzed for future management needs and opportunities. However, they are not included in any of the current alternatives.

Figure 2-8. Road System – Mission Cr and Hall Mtn Areas

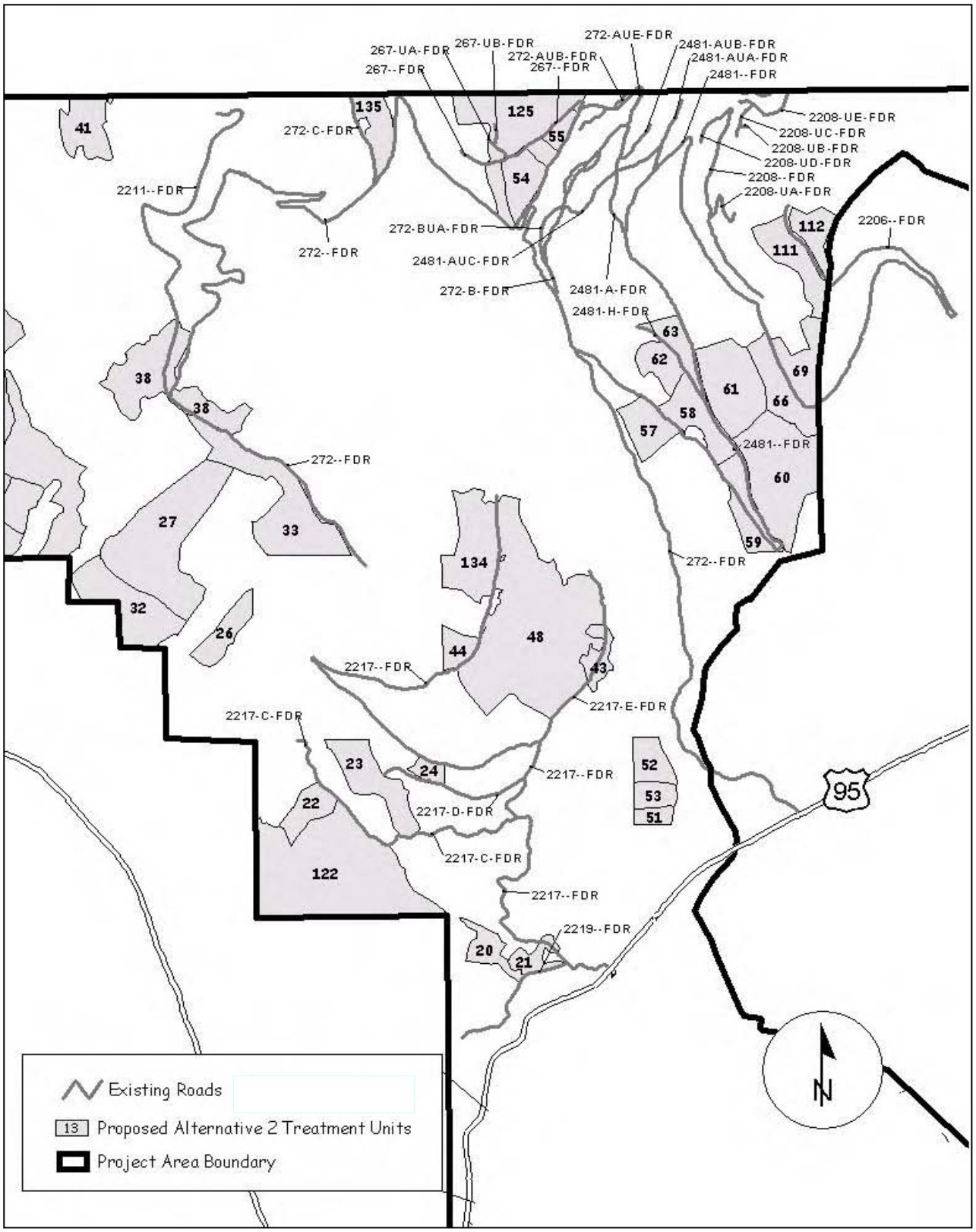


Figure 2-9. Road System -- Brush Lake Area

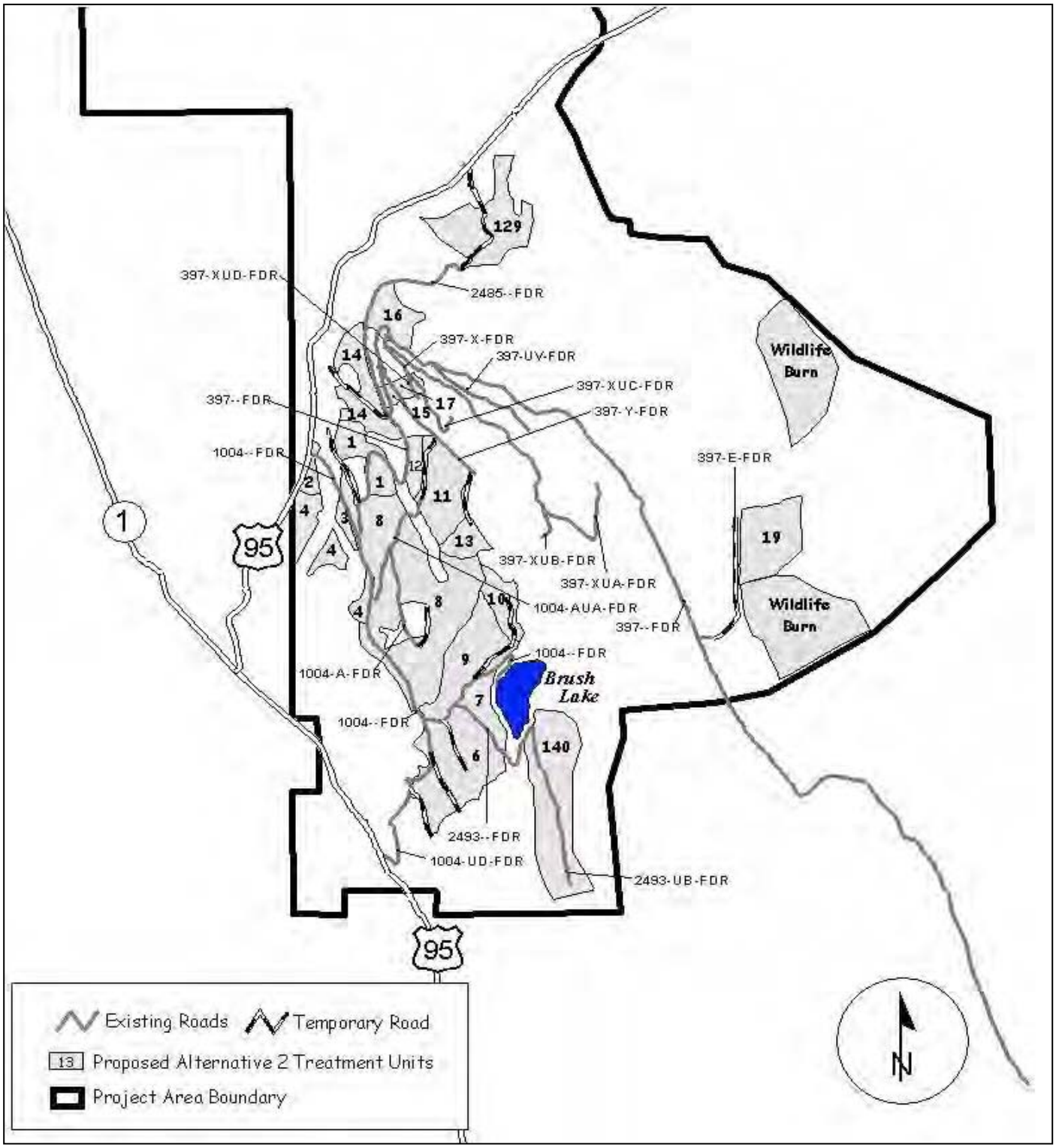


Table 2-16 Comparison of Alternatives by Resource Issues

Forest Vegetation

Issue	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
Composition and Structure	Acres reforested with PP, WL, and WP Acres of dry forest structure restored to open conditions featuring large diameter ponderosa pine	0 0	Acres reforested with PP, WL, & WP Acres of dry forest structure restored to open conditions featuring large diameter ponderosa pine. (Acres in IC and GS/CT)	1617 951 388	Acres reforested with PP, WL, & WP Acres of dry forest structure restored to open conditions featuring large diameter ponderosa pine. (Acres in IC and GS/CT)	1341 890 388	Acres reforested with PP, WL, & WP Acres of dry forest structure restored to open conditions featuring large diameter ponderosa pine (Acres in IC and GS/CT)	643 951 415
Risk of stand-replacing fire	Reduction in risk	0	Risk in proposed units reduced by	52%	Risk in proposed units reduced by	40%	Risk in proposed units reduced by	40%
Air Quality emissions (total tons)	0		3054		2460		2033	
Risk of Root Disease on dry forests	Reduction in Risk	0	Reduction in Risk	35%	Reduction in Risk	5%	Reduction in Risk	5%

Restoration Benefits, Costs and Net Value

	All proposed activities would be deferred; therefore there would be no benefits, costs, or net value from this alternative.	Restoration benefits range $2,746,000 to $3,542,000 Includes 39 miles of road improvement at $161,000 Restoration costs $2,058,000 Net Value range $688,000 to $1,484,000	Restoration benefits range $2,009,000 to $2,672,000 Includes 37 miles of road improvement at $159,000 Restoration costs $1,636,000 Net Value range $373,000 to $1,036,000	Restoration benefits range $992,000 to $1,446,000 Includes 26 miles of road improvement at $63,000 Restoration costs $802,000 Net Value range $190,000 to $644,000

Table 2-16 continued -- Comparison of Alternatives by Resource Issues

Watershed and Aquatics Habitat

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
The effects of harvesting and resulting canopy openings on water yield increases, sediment delivery to streams, and loss of aquatic habitat throughout the Brush Creek and Mission Creek watersheds.	No change from existing conditions. Water yield and sediment yield would continue to trend toward recovery. Changes in yields would be affected by natural events such as floods or fires.	Increases in water yields and sediment yields would fall within the natural range of variation and are not expected to affect stream morphology. Road 272 improvements would reduce sediment inputs from the road. Fish habitat would be maintained or improved.	Same as Alternative 2	Only basic maintenance would occur on Road 272. Other effects are the same as Alternative 2.
The effects of road construction, decommissioning, and maintenance on sediment delivery to streams and aquatic habitat throughout the Brush Creek and Mission Creek watersheds	Sediment risks from roads would remain the same as the current risk levels.	The risk of drainage crossing failure and sediment delivery would be reduces where culverts are replaced, and eliminated where culverts are removed. These measures would result in a long-term benefit to fish habitat.	Same as Alternative 2	Same as Alternative 2
The effect of timber harvesting on mass failure potential on the west-facing slopes of Hall Mountain	No change from existing conditions and potential.	No cumulative effects on mass failure potential are expected. Obliteration of Road 2217-C would reduce potential of mass failure caused by interception and concentration of runoff.	Same as Alternative 2	Same as Alternative 2

Table 2-16 continued -- Comparison of Alternatives by Resource Issues

Wildlife Habitat trends

Alternative 1	Alternative 2	Alternative 3	Alternative 4
Northern grey wolf – increases in vulnerability (road densities) or decreased prey densities. All action alternatives are consistent with Forest Plan direction to manage the habitat of species listed under the Endangered Species Act. Therefore, these actions would also be consistent with the National Forest Management Act (NFMA) requirements for population viability.	Since this proposal would not increase motorized access to previously inaccessible areas, there would be no increased mortality risk. Upgrade of recreational facilities may increase recreational use of the area, but would not increase the size of the recreational footprint. As a result, effects of increased use are unlikely to have considerable impacts on gray wolves or prey species. Vegetation treatments in the Hall Mtn/Mission Cr area would likely create a net benefit to big game species, and, consequently, to wolves. Timber harvest and associated fuels treatments may represent a substantial source of disturbance to gray wolves and their prey, but this impact would be likely be confined to a few years in any given area, after which use would resume.	Proposed timber harvest in the Hall-Mission area under Alternative 3 would be virtually identical to that proposed for Alternative 2. As a result, project-related disturbance and big game forage creation/cover reduction would be equal in these alternatives. The main difference between the two in this portion of the project area is that Alternative 3 would decommission about two fewer road miles (Road 2211). Alternative 3 also contains substantially fewer acres of timber harvest in the Brush Lake area than Alternative 2. However, for reasons discussed above, this change would likely have minor impacts on wolves with the exception of reduced available forage for prey species in Alternative 3.	Alternative 4 would impact almost 800 fewer acres in the Hall-Mission area than Alternative 2, although the units on the west face of Hall Mountain (prospective den location) would remain. This alternative would also do less to reduce road density in this area, since Road 221 would not be treated. Effects in the Brush Lake area would be the same as for Alternative 2
Canada lynx – changes to key habitat components (denning, unsuitable habitat) Assuming no wildfires occurred, denning opportunities would improve; however, the population density of their principal prey species (hare) may well decline past the point where lynx occupation of the area is viable.	Regeneration treatments would provide recruitment foraging stands. With the apparent surplus of denning habitat in the area plus the fact that stands to be treated supply only marginal denning and foraging habitat, regeneration of these stands to provide future high quality forage would probably be more beneficial to Canada lynx.	This alternative would treat slightly fewer acres than Alternative 2; thus providing slightly fewer acres of recruitment foraging stands. It would be a little less beneficial than Alternative 2, but more so than Alternative 4.	The immediate impacts would be considerably less than those of Alternatives 2 or 3 since it would treat less area. The long-term effects would be to produce much less high quality forage than Alternative 2 or 3.

Alternative 1	Alternative 2	Alternative 3	Alternative 4
Grizzly bear – changes in road densities (reported as miles of open road and total roads per square mile *in the bear use area*) Without access management, total road density would remain at its current level of 3.32 mi/mi^2 in the bear use area.	Access management during proposed activities would result in no changes in open road density during timber harvest activities. When post-harvest decommissioning activities are completed, total road density in the Deer Ridge Occupancy Area would be reduced to 3.20 miles/mile^2, and open road density would be 2.98 miles/mile^2 Note: road densities are reported for the bear use area, not the entire Mission Brush project area.	Road densities during harvest would be identical to those calculated for Alternative 2. Since Road 2211 would not be utilized as a haul route, this road would not be put into storage after activities are complete. As a result, post-sale total road density would be 3.20 miles/mile^2, and open road density for this alternative would be 2.98 miles/mile^2. Note: road densities are reported for the bear use area, not the entire Mission Brush project area.	Open road density during project implementation would not increase over current conditions, because units behind Road 2481H would be dropped. When post-harvest road decommissioning is completed, total road density would be 3.20 miles/mile^2, and open road density would be 2.98 miles/mile^2. Note: road densities are reported for the bear use area, not the entire Mission Brush project area.
Black-backed woodpecker – changes in distribution and quality of snag habitat There would be no immediate change and tree mortality would continue to provide an abundance of nesting and foraging habitat for some species. However, black-backed woodpecker populations would remain at low endemic levels. If a stand-replacing fire were to occur, it would create a temporary flush of habitat.	In the long-term (> 80-100 years), this alternative would increase the occurrence of quality snags (longer lived, seral tree species such as western white pine, western larch and ponderosa pine) by converting 1,926 acres of species at high risk of insect and disease (i.e. Douglas-fir and grand fir) to more resilient, longer-lived species. However, this alternative represents an overall decrease in snags, as tree cutting may remove small snags and subsequent stand conditions would result in lower levels of small snag recruitment. In addition, the removal of young Douglas-fir, grand fir, and offsite ponderosa pine and the subsequent open stand conditions would result in reduced susceptibility to disease. Habitat loss due to tree removal would be compensated by snag and live tree replacement where opportunities exist. In addition, prescribed burning is expected to kill a portion of the residual green trees, creating habitat for black-backed woodpeckers. Much of the project area would remain unaffected by past and proposed cutting. There should continue to be a quantity of snags less than 20” dbh that can be considered excess to meet the Northern Region snag guideline recommended levels.	By eliminating several units in the Brush Lake area (including Unit 129), Compared to Alternative 2, Alternative 3 would have less of an immediate effect on black-backed woodpeckers, but would result in less quality snag habitat in the long term since fewer high risk acres would be treated. It would treat more than Alternative 4. To ensure that snags persist at levels and distributions shown to support viable populations of species that use snags and logs, measures are included for snag and live tree replacement (see section 2.8 Features Common to All Action Alternatives).	Tree cutting would affect approximately 2,387 acres that contain some form of snag habitat. These acres represent vegetation treatments in dry-site stands where there is a greater likelihood that quality snags exist. Treatments would promote the persistence of longer-lived, seral species (e.g. ponderosa pine, western larch), resulting in high value snags in the future. Approximately 1,451 of these acres represent stands with species at high risk of insect and disease. However this alternative treats fewer acres than Alternatives 2 or 3. To ensure that snags persist at levels and distributions shown to support viable populations of species that use snags and logs, measures are included for snag and live tree replacement (see section 2.8 Features Common to All Action Alternatives).

Alternative 1	Alternative 2	Alternative 3	Alternative 4
	To ensure that snags persist at levels and distributions shown to support viable populations of species that use snags and logs, measures are included for snag and live tree replacement (see section 2.8 Features Common to All Action Alternatives).		
Flammulated Owl – trends in suitable habitat Current stand structure in most proposed dry site treatment units is clearly not meeting habitat conditions recognized in published literature as preferred by this species. There would be a continued shift toward more shade-tolerant tree species in the majority of the stands. Habitat suitability would decline. Increasing accumulations of fuel would lead to a higher risk of stand-replacing fire. If such a fire were to occur, it would take about 100 years for successional processes to restore habitat that would be similar to today's condition.	Selective cutting treatments would tend to move stands toward meeting desired habitat conditions. Converting stands of high risk Douglas-fir and off-site ponderosa pine would promote the restoration of more open grown, older forests and lead to long-term habitat stability. Dry-site habitats would be improved and maintained over time. Proposed actions would promote the long-term availability of suitable flammulated owl habitat. By reversing the general trend toward understory congestion and increased fire risk in dry-site stands, treatments would enhance flammulated owl habitat in the long-term. In the short-term, there would be no decrease in suitable habitat acres. Species viability would be maintained.	There would be less temporary disruption of possible suitable habitat than Alternative 2, but it would treat fewer acres that could be directly converted to suitable habitat. It would also forego treatment in several stands that are not likely to achieve suitable stand conditions without a stand-replacing event. By reversing the general trend toward understory congestion and increased fire risk in dry-site stands, treatments would enhance flammulated owl habitat in the long-term. In the short-term, there would be no decrease in suitable habitat acres. Species viability would be maintained.	Effects would be similar to Alternative 2; ultimately trending a comparable number of acres toward desired conditions as does Alternative 2. By reversing the general trend toward understory congestion and increased fire risk in dry-site stands, treatments would enhance flammulated owl habitat in the long-term. In the short-term, there would be no decrease in suitable habitat acres. Species viability would be maintained.

Alternative 1	Alternative 2	Alternative 3	Alternative 4
Northern Goshawk – trends in suitable nesting habitat As time passes more stands will move away from suitability. Large snags would eventually disappear, trending these stands even further from suitable nesting and foraging habitats. Regardless of whether a stand-replacing fire occurs or not, suitable goshawk nesting habitat would be lost over time.	Selective cutting would sustain forest structure compatible with nesting habitat, or in some cases create suitable nesting structure by removing understory congestion. In general, regeneration treatments would move stands out of suitable nesting condition, but may still provide, or even enhance, foraging conditions on the periphery of the units. However, most of the currently capable acres treated by selective harvest should move into suitable habitat conditions over time. The number of 30-acre contiguous nesting stands would be reduced from 12 to 10. Species viability would be maintained.	About 25% fewer acres of capable habitat would be treated; thus providing fewer acres of suitable habitat than Alternative 2, but more than Alternative 4, in the long-term. The number of 30-acre contiguous nesting stands would be reduced from 12 to 11. Species viability would be maintained.	Effects of treatments within the individual treatment units would be the same as those described for Alternatives 2 and 3. Overall, this alternative would provide fewer acres of suitable habitat than the other alternatives in the long-term because it treats fewer acres. The number of 30-acre contiguous nesting stands would be maintained at 12. Species viability would be maintained.
Fisher – changes to habitat suitability While potential foraging habitat would be preserved and some stands would become suitable denning habitat, there would be an increased risk of stand-replacing fire. This would effectively remove most burned-over areas from suitable fisher habitat for many years.	Suitable fisher habitat can be preserved through selective harvesting. Regional snag protocols would guarantee adequate snags and snag recruitment density. Grapple piling of slash would ensure some coarse woody debris remains on site.	The effects would be in between the effects of Alternatives 2 and 4. It would do less in the Brush Lake area to reduce wildfire risk and potential elimination of suitable habitat; however there is very little suitable habitat in the Brush Lake area.	Since this alternative drops most of the units in the Mission Creek drainage, fewer acres of suitable habitat would be treated with regeneration harvests. There would be more suitable habitat in the short-term than Alternatives 2 and 3; however, denning and foraging opportunities would be reduced more rapidly than under the no action alternative. Most currently suitable habitat in the Mission Creek drainage would be preserved.
Western Toad – changes to breeding habitats (wetlands) and terrestrial habitat. No impact to western toads because their would be no alteration of upland habitats or breeding habitats.	May result in temporary disturbance within treatment areas; however the changes in vegetation structure should have no long-term effect. BMPs, and INFISH protection measures should provide minimal impacts to western (boreal) toads.	Likely to be the least impactive because there would be no construction of temporary roads and considerably fewer acres would be treated in the Brush Lake area.	Effects similar to Alternative 2 since both alternatives propose the same treatment and temporary road construction in the Brush Lake area.

Alternative 1	Alternative 2	Alternative 3	Alternative 4
Pileated Woodpecker – trend toward suitable nesting conditions. ..... Habitat for species associated with large snags, such as the pileated woodpecker would continue to decline; the presence of large snags would continue to be relatively uncommon due to the overabundance of Douglas-fir and grand fir. This alternative would lead to a higher risk of stand-replacing fire. If a stand-replacing fire were to occur in the Brush Lake area, there would be only minor consequences to pileated habitat because there would be loss of a relatively small amount of mature and old growth habitat components. However, stand-replacing fire in the Hall Mountain/Mission Creek area would have greater impacts on this species, since these areas contain a higher percentage of currently suitable nesting habitat in the project area.	Treatment would trend stands toward a larger size class and older age classes of trees. No treatments would reduce old growth structure or integrity. Treats approximately 3,098 acres of capable habitat. Given these stands are not likely to provide nesting habitat, treatment would accelerate trend of these stands toward suitable habitat. In the Brush Lake area about 3/4s of the capable habitat does not provide patches of large diameter trees required for nesting. Treatments would have a minor immediate effect. Treatments in dry-site old growth in the Hall Mtn area would affect a small proportion of potential nesting habitat. Over the long-term (80-100 years) regeneration treatments would convert tree species to longer-lived seral species and encourage persistence and sustainability of large snag habitat. Selective cutting favors leaving desired species and trends stands to older size class and promotes larger snags. Treatment of dry sites to remove competing understory trees so the stands resemble more open, historic condition may decrease value of the stands to pileated woodpeckers. However, the existing good habitat in dense dry sites is a temporary situation that would decline through stand-replacing fires, or death and falldown of the large snags. Removing competing understory would increase the number of large snags in the long term, but in the short term may reduce the density of the stand below that preferred by pileated woodpeckers. This effect should be compensated by the growth of large amount of stands in the middle-sized class for the short-term loss possibly experienced by this species. Overall, the amount of acres available for pileated woodpecker nesting would remain unchanged as long as adequate numbers of snags and snag recruitment trees are left.	Treatment would trend stands toward a larger size class and older age classes of trees. No treatments would reduce old growth structure or integrity. Approximately 2,369 acres of capable habitat would be treated. As in Alternatives 2 and 4, the amount of acres available for pileated woodpecker nesting would remain unchanged as long as adequate numbers of snags and snag recruitment trees are left via the Regional snag retent ion guidelines.	Treatment would trend stands toward a larger size class and older age classes of trees. No treatments would reduce old growth structure or integrity. Approximately 2,788 acres of capable habitat would be treated. As in Alternatives 2 and 3, the amount of acres available for pileated woodpecker nesting would remain unchanged as long as adequate numbers of snags and snag recruitment trees are left via the Regional snag retention guidelines.

Alternative 1	Alternative 2	Alternative 3	Alternative 4
White-tailed deer – changes to critical mid-winter range. The natural tendency for these open stands is to progress toward later seral stages that become dominated by mixed conifer species, shading out an important forage component. Without periodic disturbance, the production of forage on a meaningful scale would not be sustainable.	In combination with prescribed burning, the treatments in this alternative would improve habitat conditions for white-tailed deer.	This alternative would generate less early successional forage than either Alternative 2 or 4, but would affect essentially the same number of acres of suitable critical mid-winter range.	Alternative 4 would provide more modest improvements of forage conditions than Alternative 3. However, since it would use regeneration treatments on fewer acres, it would convert fewer acres into the early stages of forest development with enhanced future foraging opportunities than Alternative 2 would.
Forest Land birds – changes to priority habitats and vegetative diversity. The perpetuation of a homogenous landscape dominated by Douglas-fir would decrease habitat richness and habitat diversity, thereby providing limited niches to support the diversity of land birds that occur on a forested landscape.	Treatments under this alternative would encourage the long-term stability of the dry habitats by altering species composition, treating overcrowded conditions of shade-tolerant trees, and including fire to provide benefits similar to natural disturbances. Opening the forest canopy on an other wise monotonous landscape and managing for snags in these areas would increase landscape diversity and provide habitat for species that rely on more open habitat conditions.	In general, the effects would be the same as Alternatives 2 and 4; however on a smaller scale because this alternative does not include the Ecosystem burns and it includes fewer acres of silvicultural treatments than Alt 2, but more than Alt 4.	In general, the effects would be the same as Alternative 2; and similar to Alternative 3 since it includes the Ecosystem burns but includes fewer acres of silvicultural treatments than Alternative 3.

Table 2-16 continued -- Comparison of Alternatives by Resource Issues

Recreation Facilities and Opportunities

Issue	Alternative 1 – No Action	Alternative 2	Alternative 3	Alternative 4
Safety and Universal Accessibility	Concerns and non-compliance conditions would continue.	Rehabilitates facilities and provides the following opportunities: - Restore quality of site, - Meet Universal Accessibility requirements - Safe access along roads and at site facilities - Install informational signing for Brush Lake - Develop public information via news releases	The same as Alternative 2	The same as Alternative 2
Meeting Future Needs	No change in the ability/capacity to meet projected future needs.	Brush Lake Campground improvements would accommodate current and projected future use and follow the intent of retaining the rustic character of the camping and picnic area.	The same as Alternative 2	The same as Alternative 2
Vegetation Management in the Brush Lake Area	Without long-range guidelines, current concerns would continue.	Long-range guidelines would be in place, reducing concerns. Off-site ponderosa pine would be replaced with local native trees adapted to the ecosystem.	The same as Alternative 2	The same as Alternative 2
Trail Management	Current conditions would continue, including unauthorized cross-country use by ATVs There would be no change in amount or types of trails.	Provides designated area closures, and designated trail systems for both motorized and non-motorized recreation. Averts the current trend of ATVs damaging resources.	The same as Alternative 2	The same as Alternative 2
Dispersed Recreation	No change in opportunities. Continued risk of damage or loss of areas because of wildfire.	Retains the rustic and generally private character of the dispersed recreation areas. Risk of wildfire is reduced within the proposed treatment units.	The same as Alternative 2	The same as Alternative 2

Chapter 3 -- Affected Environment **3-1**
3.1 Introduction *3-1*
3.2 Supplemental Analysis Related to the Affected Environment *3-1*
3.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS *1*
3.3-A. *Past Timber Activities* 1
3.3-B. Effects of Past Harvest, Fire Suppression Activities, White Pine Blister Rust 3-6
3.4 Forest Vegetation *3-8*
3.4-A. Forest Disturbances 3-8
3.4-B. Humans in the Mission Brush Ecosystem 3-11
3.4-C. Timber Management 3-14
3.4-D. Insect and Disease Disturbance Factors 3-15
3.4-E. Forest Habitat Type 3-20
3.4-F. Forest Composition 3-22
3.4-G. North Zone Geographic Assessment Findings 3-24
3.4-H. Forest Structure 3-27
3.5 Supplemental FEIS Old Growth Review *3-29*
3.5-A. Methodologies 3-29
3.5-B. Project Level Old Growth Review 29
3.5-C. Forest Vegetation Conclusions 3-30
3.5-D. Desired Conditions 3-32
General Project Design Features 3-34
3.6 Forest Aquatics *3-35*
3.6-A. Regulatory Framework 3-35
3.6-B. Methodology 3-35
WATSED Model Limitations 3-35
3.6-C. WATSED Analysis 3-37
3.6-D. Level 1 Slope Stability Model (LISA) 3-37
3.6-E. Field Reviews 3-37
3.7 Watershed Description and Characterization *3-38*
3.7-A. Sensitive Landtypes 3-38
3.7-B. Rain-on-Snow Events and Watershed Responses 3-40
3.7-C. Data for Wildlife and Fisheries Analysis 3-40
3.7-D. Fry Emergence 3-41
3.7-E. Fisheries Cumulative Effects Area 3-41
3.7-F. Aquatics Habitat Condition and Connectivity 3-44
3.7-G. Watershed and Erosional Processes 3-45
3.7-H. Fisheries Reference Conditions 3-49
3.7-I. Fisheries 3-51
3.8 Wildlife *3-52*
3.8-A. Regulatory Framework 3-52
3.8-B. Analysis Methods 3-53
3.8-C. Affected Environment Introduction 3-54
3.8-D. Species Analyzed in Detail 3-57
3.9 Recreation Existing Condition *3-67*
3.9-A. Recreation Review of Cumulative Effects of Past Harvest Activities 3-67
3.9-B. Recreation Use 3-67

List of Tables

Table 3-1 Table Existing Condition of Vegetation in the Project Area 3-23
Table 3-2 Minimum Standards for Old Growth Forest Types in Project Area 3-30
Table 3-3 Old Growth Allocations in Management Units 19 and 20 3-30
Table 3-4 Species Not Analyzed in Detail 3-54
Table 3-5 Threatened and Endangered Species Analyzed in Detail 3-57
Table 3-6 Sensitive Species Analyzed in Detail 3-60
Table 3-7 Management Indicator Species Occurring on the Idaho Panhandle National Forests 3-65

List of Figures

Figure 3-1. Northwest Peak Fire, August, 2000 lightning-caused fire on the Bonners Ferry Ranger District. 3-9
Figure 3-2. Example of a non-lethal fire in a managed stand northeast of Bonners Ferry. 3-9
Figure 3-3. Northwest Peak Fire -- A stand replacing or crown fire in action. This photo illustrates lethal fire conditions. 3-10

Figure 3-4. Post-fire conditions caused by a lethal fire. 3-10
Figure 3-5. Lookout Tower used for early detection 3-11
Figure 3-6. Aircraft dropping fire retardant 3-11
Figure 3-7. Helicopter with bucket used to drop water on "hot spots" 3-12
Figure 3-8. Hand Crew constructing fireline 3-12
Figure 3-9. Mission Brush Fire History 3-13
Figure 3-10. Mission Brush Timber Management History 3-14
Figure 3-11 and Figure 3-12. Dwarf mistletoe on larch and Douglas-fir trees. 3-16
Figure 3-13. Top kill from blister rust in a white pine tree. 3-17
Figure 3-14. Project Area Stand Conditions. 3-17
Figure 3-15. Historic Range of Western White Pine 3-18
Figure 3-16. Example of a regenerated ponderosa pine / larch shelterwood cut (harvested in the mid-1980s) near the project area. 3-19
Figure 3-17. Conditions in the project area near Brush Lake. 3-20
Figure 3-18. Fire scars on ponderosa pine. 3-21
Figure 3-19. Genetically inferior "Offsite" Ponderosa pine near Brush Lake. 3-22
Figure 3-20. Comparison of Existing Distribution of Forest Types within the Project Area and the Kootenai River Sub-Basin 3-23
Figure 3-21. Historic vs. Current Forest Types - Mission Brush Project Area Species distribution from a historical perspective. 3-23
Figure 3-22. Absolute Change in Species Composition -- Kootenai River Sub-basin 3-24
Figure 3-23. North Zone Geographic Areas 3-25
Figure 3-24. Historic vs. Current Dry Site Species Composition: Kootenai Sub Basin and the Mission Brush Project Area 3-26
Figure 3-25. Forest Structures in the Mission Brush Area 3-27
Figure 3-26. Mission Brush Forest Structure: Historic vs. Existing 3-28
Figure 3-27. Dry Forest Structure (Size Class) -- Historic vs. Current 3-31
Figure 3-28. Altered Stand Structures and Species Composition 3-32
Figure 3-29. Example of fuel buildup near Brush Lake. 3-33
Figure 3-30. Photo of a managed ponderosa pine stand. 3-34
Figure 3-31. Mission Brush Watershed Effects Analysis Boundaries 3-39
Figure 3-32. Historic and existing condition of percent increase in peak flows 3-47
within the Mission Creek Watershed, projected until 2040 3-47
Figure 3-33. Estimated acres harvested or burned in the project area since 1920 by decade, modeled with WATSED 3-48
Figure 3-34. Effects of road building and sediment yield 3-48

Chapter 3 -- Affected Environment

3.1 Introduction

This chapter describes the current condition of the resources as they relate to the driving issues. These issues represent components of the environment that would affect, or that could be affected by the alternatives if implemented. Much of the information in this chapter incorporates the findings from the Upper Columbia River Basin study (http://www.icbemp.gov) and the IPNF North Zone Geographic Assessment (NZGA). The North Zone geographic area (Bonners Ferry, Sandpoint, and Priest River Ranger Districts) consists of approximately one million acres of the northern portion of the IPNF. Assessments of individual sub-basins (essentially ranger districts) were also conducted. For this project documentation the Kootenai River sub-basin refers to the Bonners Ferry Ranger District (BFRD) and accounts for roughly 400,000 acres.

To assist the public and decision maker in locating information in this Supplemental FEIS, items that address the Court's opinion on *Lands Council v. Powell*[1] are displayed in two-column format; narrative from the 2004 FEIS is displayed in single-column format.

3.2 Supplemental Analysis Related to the Affected Environment

This section responds to the Ninth Circuit Court's opinion on *Lands Council v. Powell*[1], which was released after the 2004 FEIS and ROD for this project.

The following items are related to the analyses and documentation required by the 9th Circuit:

- Past harvest activities; as appropriate, their contributions to the cumulative effects of this proposal
- Soils analysis of probable effects
- WATSED model analysis of probable effects
- Old growth analysis of probable effects
- Data for wildlife and fisheries analysis of probable effects
- Fry emergence analysis for fisheries

After last year's release of the FEIS and ROD, there were also updates to the USFWS listing of threatened or endangered wildlife species, and Regional Forester updates to the Northern Region's sensitive wildlife species list. This information is included as new information in this FEIS.

3.3 Changes between the 2004 FEIS/ROD and the Supplemental FEIS

3.3-A. *Past Timber Activities*

Past timber harvests need to be described in suitable detail (time, place, type and scale) including a sufficiently detailed explanation of the effects of different harvest methods in order to promote an informed assessment by the public and agency personnel[1].

The Council on Environmental Quality recently clarified the analysis of past actions. The June 24, 2005 memo states, "In this Memorandum, the Council on Environmental Quality (CEQ) provides guidance on the extent to which agencies of the Federal government are required to analyze the environmental effects of past actions when they describe the cumulative environmental effect of a proposed action in accordance with Section 102 of the National Environmental Policy Act (NEPA), 42 U.S.C. § 4332, and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. parts 1500-1508. CEQ's interpretation of NEPA is entitled to deference. *Andrus v. Sierra Club*, 442 U.S. 347, 358 (1979). (See Project File document NEPA-44)

Section A-3 below contains more information concerning the CEQ guidance.

[1] Direction from the Ninth Circuit Court *Lands Council v. Powell*, 395 F.3d 1019 (2005)

A-1) Changes between 2004 FEIS/ROD and the Supplemental FEIS

The information regarding current activities (since release of the 2004 FEIS) on private land has been updated in the project file (Project File document COMP_BY_LEGAL, 4/12/2005, provided by Idaho Dept of Lands.)

The effects from past activities on both private and National Forest Systems lands are discussed in section 3.3-B below. Also, Appendix A Tables A-1 and A-2 display past activities that were considered in this analysis.

A-2) New Information -- Lands Council v. Powell

In *Lands Council v. Powell*, the U.S. Court of Appeals for the 9th Circuit held that, under the circumstances presented in the case, proper cumulative impact analysis required some cataloguing of past projects and their effect on the current project area. Furthermore, such cataloguing should provide sufficient detail to allow for analysis of the differences between prior projects and proposed projects, which could provide the information necessary to consider alternatives that might have less impact on the environment.

Within this EIS we have provided information of relevant past, present and reasonably foreseeable projects or activities that have occurred, are occurring, or are proposed to occur within each of the resource cumulative effects areas examined in this analysis (see Chapters 3 and 4). Additionally, an adequately detailed discussion of the effects of these past, ongoing, and reasonably foreseeable activities has been provided to promote an informed assessment of environmental considerations and aide in assessing whether one form or another of harvest would assist in meeting the project's purpose and need for action with minimal environmental harm.

See Tables 1 and 2 in Appendix A for details of past projects that were considered. The types of effects and their consideration for this project are discussed below in Section 3.3 A-4).

A-3) CEQ Guidance on Consideration of Cumulative Effects of Past Actions

On June 24, 2005 the Council on Environmental Quality (CEQ), whose responsibility it is to coordinate federal environmental efforts and work closely with agencies and other White House offices in the development of environmental policies and initiatives, provided guidance[2] (Project File document NEPA-44) to federal agencies on the consideration of past actions in cumulative effects analysis. CEQ stated that "generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historic details of individual past actions" (CEQ memo p. 2).

Cumulative impact is defined in CEQ's NEPA regulations as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" (40 CFR 1508.7). CEQ has interpreted this regulation as referring only to the cumulative impact of the direct and indirect effects of the proposed action and its alternatives when added to the aggregate effects of past, present, and reasonably foreseeable future actions (CEQ memo p. 2).

With respect to past actions, during the scoping process and subsequent preparation of the Mission Brush EIS, the Forest Service determined what information regarding past actions was useful and relevant to the analysis of cumulative effects. While CEQ found that cataloging past actions and specific information about the direct and indirect effects of a past project's design and implementation could, in some contexts, be useful to predict the cumulative effects of the proposal, the regulations do not require the Forest Service to catalogue or exhaustively list and analyze all individual past actions (CEQ memo p. 3).

This EIS provides a description of known past activities and their effects. However, there is a marked difference between past and current land management practices and policies that makes comparisons between the effects of past practices and current practices difficult. The evolution that has occurred in land management practices is the result of science and our ongoing monitoring actions.

[2] CEQ Memorandum to the Heads of Federal Agencies regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005.

A-4) Consideration of Cumulative Effects of Timber Harvest and Associated Activities

a) Past Road Construction

On the forest, early- to mid-20th century road construction activities focused construction mainly through river valleys, riparian areas, floodplains, and adjacent hillsides. The roads efficiently provided access but decreased the land's effectiveness as wildlife habitat and constricted stream channels, while providing a new avenue for erosion and discharge of sediment into streams.

Roads on national forest lands often were simply an expansion of existing trails and paths that provided access so that they would accommodate newer equipment and current land uses. In some situations, roads were developed on abandoned railroad beds. In both cases, the location and design were predetermined from the previous use and era.

As time progressed, roads were "designed" and located to achieve their primary purpose, which was to provide access and haul products at a minimal cost. In the decades following World War II (1950s –'70s), the road network was rapidly expanded to support the domestic need for lumber in housing construction.

b) More Recent Road Construction Methods

Over the last 20 years, both road design and location have evolved as necessary tools to not only provide efficient access; but also to protect the valuable watershed resources they encroached upon. Forest Service Best Management Practices (BMPs) currently incorporated into road construction and reconstruction activities on the forest include:

- Road surfacing (gravel, etc…) was incorporated to not only provide better traffic usage; but also to prevent and control erosion from the road surface.
- Road drainage controls are now being incorporated into designs that:
  - Reduce the erosive flows in ditches by providing frequent cross-drains to relieve ditch flows;
  - Avoid water movement down the road by dispersing the drainage quickly by crowning or outsloping the road surface;
  - Stabilize ditches by lining; and
  - Disperse drainage water (that often carries sediment) onto stable forested slopes before ditches discharge into waterways.
  - Allow new and existing stream crossings to safely pass extreme events (i.e. 100 year flood event).

(BMPs are found in FSH 2509.22 Soil and Water Conservation Practices Handbook)

Special construction techniques and designs have been utilized (i.e., full- or partial-benching of roads) to avoid unstable side casting of waste materials. Windrowing clearing slash prevents sediment delivery to streams from construction activities themselves as well as from erosion of road fills and treads that are not yet protected with erosion control vegetation.

Some roads now are designed to take advantage of the non-uniformities of the slopes they cross by using "rolling grades" and grade breaks to prevent the potential for accumulations of water or excessive ditch flows that have destabilized the road bed or caused surface erosion in the past.

Designers and planners develop road networks that avoid highly erosive or unstable slopes utilizing the *land system inventory*, and the knowledge and experiences of hydrologists, soil scientists, and geotechnical engineers.

Road crossings are being located at more stable sites and crossing designs are now considering water quality and fish passage as primary design criteria, rather than criteria that just account for costs and traffic efficiency.

Roads are being located well away from streams and their riparian areas where ever practical; and the number of crossing sites is being minimized.

These features are in stark contrast to past road locations that sometimes resulted in chronic sources of sediments, extended exposure of streams to direct sunlight resulting in temperature elevations, and nearly permanent reductions of the replacement sources of the structural components of streams and aquatic cover, such as riparian deadfall.

In the past, when a road's utility ended, the road was simply abandoned. These abandoned roads have been a substantial water quality and slope stability issue as they have deteriorated, especially without any maintenance. Current practice is to restore key abandoned or no longer useful roads to a "hydrologically neutral" condition. A hydrologically neutral road's remnants are self-maintaining and are no longer disturbing slope stability or the movement of slope water, either on or below the soil surface, or are no longer disturbing the natural functions and adjustments of streams, wetlands, and other water bodies.

Use of Best Management Practices and the Inland Native Fish Strategy

Best Management Practices

Impacts to forest water and soil resources from logging practices and road activities have also been reduced over the past 20 years with the introduction of Best Management Practices (BMPs) and Inland Native Fish Strategy (a.k.a. INFISH) management direction. Based on research studies, current BMPs and INFISH Riparian Habitat Conservation Areas (RHCAs) can reduce sediment yields compared with historical practices (Lee et al 1997, USDA 1995).

In 1972, Section 208 of the Clean Water Act Amendments established the regulatory framework for non-point source pollution control thorough use of BMPs. BMPs are defined in Idaho as a practice or combination of practices determined to be the most effective and practicable means of preventing or reducing the amount of pollution generated by non-point sources (IDAPA 20.02.01). BMP monitoring is conducted annually by the forest to validate the implementation and effectiveness of BMPs associated with land management activities. Monitoring results are used to adapt future management actions where improvements in meeting water quality objectives are indicated. Forest monitoring of BMPs indicates that in most cases they continue to function as expected and are meeting their intent (IPNF 2002, 2003).

Inland Native Fish Strategy

At the time the IPNF Forest Plan was written (circa 1987), the emphasis was on developing a commodity production strategy while minimizing impacts to watersheds and aquatic resources, including fish. The strategy for watershed management was constructed in the Forest Plan as a “maintenance” objective. In some situations, thresholds, or “minimum impact” standards defined the criteria for maintenance. To ensure that watersheds and aquatic resources were maintained during forest management activities, BMPs were applied. Despite the existing forest plan standards and BMPs, the condition of fish habitat on the forest was declining, primarily due to timber harvest and road building activities (IPNF 1992).

In 1995, the forest plan was amended to include INFISH management direction (USDA 1995). The implementation of INFISH gave greater protection to aquatic resources, especially riparian-dependent systems. The management direction provided by the INFISH amendment is designed to protect and maintain the structure and function of riparian and aquatic systems.

INFISH contains goals for healthy, functioning watersheds, riparian areas, and associated fish habitats; Riparian Management Objectives (RMOs), and performance-based standards and guidelines for land management activities (i.e., timber, roads, grazing, recreation, minerals, fire/fuels, lands, riparian area management, watershed restoration, fisheries and wildlife restoration).

Instead of allowing some “acceptable” level of effects on riparian and aquatic systems, INFISH aims to protect aquatic resources from detrimental effects. INFISH gives riparian-dependent resources priority over other resources in the Riparian Habitat Conservation Areas (RHCAs), so that while RHCAs are not “lock out” zones, activities that occur in them must either benefit riparian and aquatic resources or at least “not slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system” (USDA 1995).

Incorporation of the INFISH management direction into the Forest Plan has led to improvement in the condition of aquatic resources by offering greater protections to the critical riparian areas. In addition, INFISH allows for and encourages watershed restoration. Restoration has occurred over the years across the IPNF. Over 1,300 miles of roads have been decommissioned on the IPNF from 1991-2003 (IPNF 2003).

c) National Forest Harvest Methods and Timber Removal

Harvest methods and removal of timber products from the national forest have changed substantially over time. Early harvest methods (1950s, 60s, and 70s) focused primarily on financial objectives of providing low cost wood products. Harvest placement often occurred in the highest volume, easily accessible stands. Timber harvest often occurred within riparian areas and adjacent to streams. Most of the harvest prescriptions were primarily designed to produce healthy young stands with shorter rotation ages.

Modern timber harvest prescriptions and design emphasize desired conditions of the forest after the harvest. This usually results in the retention of various amounts of trees in a post-harvest stand, addressing objectives that may include wildlife habitat, watershed conditions, hazardous fuels, visual quality, soil productivity, forest health and others.

On sites determined suitable for timber production, timber harvest may also produce timber products on a regulated basis while compatible with these other resource objectives and values. Some examples where timber production and resource objectives can be achieved simultaneously are:

- Reducing tree densities to decrease bark beetle hazard, thereby prolonging the development of the forest and maintaining tree cover;
- Managing tree canopies to limit fire spread from the forest floor to the tree crowns;
- Developing flammulated owl habitat in ponderosa pine forest through removal of smaller stems crowding larger trees, thereby providing more room to grow for the remaining trees, and open stand conditions favored by the owl;
- Designing harvest patterns across the landscape to facilitate wildlife movement, such as providing corridors and preserving travel routes for ungulates. Also, using harvest prescriptions and landscape patterns as part of a wildfire hazard reduction strategy;
- Increasing the amount of native western white pine, western larch and ponderosa pine, which generally are insect and disease resistant and are long-lived, as well as increasing western red cedar in valley bottoms, where it historically was more abundant than today;
- Using variable retention harvests to meet visual management objectives.

Other elements of modern harvest prescriptions that address specific resource objectives include the following:

- Retention of snags for cavity nesters,
- Retention of down wood for soil nutrition and wildlife habitat,
- Maintaining sediment filtering vegetation near riparian areas, and
- Maintaining vegetation diversity through hardwood retention and protection of rare plants.

d) Logging Systems for Tree Removal

Increased environmental awareness has also lead to improvements in logging systems that we use to remove trees from the forest. Early harvests emphasized cheap, labor intensive logging methods such as railroad transportation systems, horse logging, short distance jammer systems, and tractor logging. Logging systems were selected primarily by the least expensive method to transport the trees from the forest to the mill. This sometimes involved harvesting on steep slopes, creating excessive soil disturbance and increasing the risk of erosion. Streams were sometimes used as a method to transport logs from the harvest site, causing impacts to the aquatic system and adjacent riparian habitat. Road systems were sometimes dense (10 mi. per sq. mi.) to facilitate rapid and inexpensive removals, in some cases compromising water quality.

Today's logging systems recognize and reduce the threat of environmental harm in a number of ways. Tractor logging generally occurs on slopes of 35% or less, and limited to designated locations, reducing soil impacts. Skyline and other cable yarding systems are used on steeper slopes, greatly reduces the amount of soil disturbance. Increasingly, helicopter logging is used, which extends yarding distances and thereby reduces road densities. A suite of Best Management Practices and Forest Plan Standards and Guidelines aids in the development of the least impactive design possible. Monitoring during and after the sale is completed provides a valuable feedback loop that quickly identifies and corrects variances should they occur.

e) Activities in Old Growth Stands

The IPNF ceased regeneration harvest of allocated old growth stands a number of years ago. Presently, our focus is on maintaining the old growth stands that we have and allocating additional stands for future old growth as they mature.

On drier sites, restoration of old growth may include various mixes of prescribed fire, and thinning to restore historic more open old growth stand structures and reduce risk of stand replacing fire. Planting of shade-intolerant, fire-adapted species may also be done if these are in short supply. On these dry sites, our objective is to restore and sustain the old growth by retaining the large old trees, preserving the old growth characteristics, and restoring historic old growth structures and processes (IPNF 2003).

f) Conclusions Regarding Past Activities

For the above stated reasons, changes in road construction/reconstruction and maintenance practices; implementation of INFS management direction and watershed BMPs; and changes in harvest practices and objectives, an individual analysis of past projects cannot be clearly compared to analysis of the proposed actions. However, the incremental effects of proposed action when added to the effects of the past, present, and reasonably foreseeable actions is displayed and provides a complete assessment of cumulative effects.

3.3-B. Effects of Past Harvest, Fire Suppression Activities, White Pine Blister Rust

European settlers came into the Kootenai Valley during the early to mid 1800s. During this time, construction of railroads, logging, conversion of wetlands to agricultural fields and clearing of timber for homes and fields were common activities on private lands. Past timber management occurred in the project area as far back as 1909, but most of the logging in the Mission Creek area was done in the 1950s. The three main factors contributing to changes in the vegetation across the landscape have been fire suppression, past logging practices, and white pine blister rust fungus.

Types of effects are discussed below (additional information about historic and current vegetative conditions is included in Chapter 3 and in Appendix A.)

B-1) Fire Suppression

Fire is the major natural disturbance factor that produces changes in the vegetation in local forest ecosystems. It was responsible for the widespread occurrence and even the existence of ponderosa pine, western larch, lodgepole pine and western white pine; it maintains ponderosa pine at lower elevations and kills ever-invading Douglas-fir and grand fir (Spurr and Barnes, 1980). Early Native Americans burned parts of the ecosystem to promote a diversity of habitats (FEIS, pg 3-5). Following large devastating wildfires in the region in the 1890s and in 1910, fires were fought more aggressively and effectiveness increased in the 1940s and 1950s.

The effectiveness of these efforts has caused several changes in the ecosystem, as follows:

- Stands have become overcrowded or overstocked with shade-tolerant species.
- There has been a general loss in vigor in all species, but particularly in shade-intolerant ponderosa pine and larch.
- Root diseases, insect infestations, stem and butt decays and foliage diseases are at unnaturally high levels in many stands.
- White pine blister rust, plus bark beetle attacks, has caused significant mortality in western white pine stands.
- Stands that used to have a high component of western white pine are now typically dominated by Douglas-fir, grand fir and lodgepole in the overstory, with thick layers of cedar and hemlock in the understory.
- Aspen colonies are being out-competed by longer-lived, shade-tolerant conifers.

B-2) Timber Management

Effects of timber management varied, depending on the type of harvest (ranging from even-aged regeneration cutting to selection based on economics) and logging systems (i.e., tractor or skyline.) After the 1945 wildfire in the Brush Lake area, hundreds of acres were planted to ponderosa pine. However, because the seedlings were not grown from a local seed source, they are not adapted to the local climate, soil and ecological conditions in the area and most of these “off-site” trees are dying from root diseases and bark beetles.

Past activities on privately owned lands, as well as National Forest System lands, were considered in the analysis for the FEIS and the effects of those activities are documented in Chapters 3 and 4. Where appropriate for individual resources, the activities on Canadian lands in the upper Mission Creek watershed were included. When considering the effects of past land management activities, it is important to remember that ecosystem components are resilient and over time can recover from both natural disturbance and human-caused changes.

These past events (harvest, road construction and white pine blister rust) have affected the ecosystem in the ways discussed on the following page.

B-3) Timber harvest

Timber harvest created mosaics of wildlife habitats. Wildlife species will occupy their preferred niche on the landscape and move from place to place as forest structures change and different habitat conditions develop. Conversion of stands from relatively open ponderosa pine/Douglas-fir dominated stands to denser stands encroached by young Douglas-fir and grand fir has made some stands less accommodating to species that rely on open stand conditions. Effects vary depending on the wildlife species being addressed; more information is located in Chapter 4 Past Harvest Activities - Wildlife Review.

Early-century logging removed some larger diameter ponderosa pine and western larch, which contributed toward a decreased trend in seral species (ponderosa pine, white pine, and western larch) and an increase in shade-tolerant species (Douglas-fir, grand fir, western hemlock, cedar) in the Kootenai River Sub-basin. This early logging also contributed to some small-scale losses in old growth, but the relatively low percentage of old growth in the project area (compared to the Sub-basin as a whole) is more closely related to large-scale fires that occurred in the area in the late 1890's and 1945.

Early-century logging used log flumes to transport logs downstream, harvested in some riparian areas, and built some roads near stream channels. The riparian logging and flume construction created numerous woody debris jams, resulting in stream channel alterations, sedimentation, and long-term loss of riparian cover. The debris jams have caused channel diversion and have stored substantial volumes of sediment. Riparian logging also increased stream bank erosion, channel diversion or channel migration, created fine sediment and bed load material. Mission Creek has been influenced by both natural and human-related activities and is now a braided or multiple-channel system between the confluences of the East Fork of Mission Creek and Round Prairie Creek.

Past regeneration harvests can alter snowmelt patterns, water yields and sediment yields. Figure 3-32 shows the changes in percent increase/decrease in peak flows since the late 1940s projected through the year 2040.

B-4) Road construction

Historic road construction placed some roads on unstable landtypes in the Hall Mtn area; contributing to saturated hill slopes and concentrated runoff in small intermittent draws, resulting in landslides and gully formation.

Construction increased sediment yields; however, construction prior to adoption of the Idaho Forest Practices Act in 1970 did not require the use of Best Management Practices. After 1970, road construction resulted in presumably less sediment.

Figure 3-34 displays the effects of road building on sediment yield from the late 1920s projected through the year 2020. Roads can increase sediment in watersheds.

Roads increase access; this has beneficial effects such as rapid response to wildfires, access for land management activities and recreation uses. Conversely, they dissect wildlife habitat.

B-5) White Pine Blister Rust

This stem disease was accidentally introduced into Vancouver, British Columbia from Europe about 1910 and had spread into Idaho by 1928. Blister rust and bark beetles have caused significant mortality in western white pine stands throughout north Idaho.
Effects of blister rust include:

- Increased levels of standing and down dead woody material
- Loss of the white pine cover type with stands now dominated by Douglas-fir, grand fir and lodgepole pine in the overstory, with thick layers of cedar and hemlock in the understory. See Figure 3-15 concerning the range of native white pine.

B-6) Conclusions

Effects of past harvest activities on both National Forest System lands and private lands and how they have influenced the existing environment are disclosed in Chapters 3 and 4.

Cumulative effects of the past activities and proposed activities are discussed in Chapter 4.

3.4 Forest Vegetation

The analysis area is made up of ever-changing, dynamic ecosystems; however, current vegetative conditions can be summarized. Timber stands are designated by the characteristics of the vegetation and activities, such as thinning, which have occurred over time. The timber stands are the primary units for collecting, examining, and summarizing tree information in the Timber Stand Management Record System (TSMRS).

One of the primary goals of this project was to assess the changes in forest composition (what the forests are made up of), forest structure (how things are arranged in the forest), and forest disturbance processes (primarily fire and timber harvest) over time. When changes in historic conditions are compared to current conditions, management options can be developed. The existing conditions of the components described in this chapter are also pertinent to the resource issues described in Appendix A.

3.4-A. Forest Disturbances

The forested hillsides in the analysis area are composed of a wide range of vegetation in various structural conditions. As everywhere, they have changed and will continue to change through time. Various influences have contributed to these changes, both natural and man-caused.

A-1) Prior to European Settlement

Fire is *the* major disturbance factor that produces vegetation changes in the local forest ecosystems. Many ecosystems are regularly recycled by fire; life for many forest species literally begins and ends with fire. If the role of fire is altered or removed, this will produce significant changes in the ecosystem. Fire has burned in every ecosystem and virtually every square meter of the coniferous forests and summer-dry mountainous forests of northern Idaho, western Montana, eastern Washington and adjacent portions of Canada. Fire was responsible for the widespread occurrence and even the existence of ponderosa pine, western larch, lodgepole pine, and western white pine. Fire maintains ponderosa pine throughout its range at the lower elevations and kills ever-invading Douglas-fir and grand fir (Spurr and Barnes, 1980).

In the following discussion, "severity" refers to the amount of damage a fire causes to stands of timber and "return interval" refers to how often a particular type of fire occurs. Photos and definitions summarize the types of fires that occur in our forested ecosystems.

Fire Severity and Return Intervals

Mixed severity fires - fires that kill more than 10%, but less than 90% of the dominant tree canopy (see photo below). Mixed severity fires are commonly patchy, irregular burns, producing a mosaic of different burn severities. Return intervals for mixed severity fires may be quite variable. Figure 3-1 is a good illustration of a mixed severity burn resulting from a lightning strike.

Figure 3-1. Northwest Peak Fire, August, 2000 lightning-caused fire on the Bonners Ferry Ranger District.

Non-lethal fires - fires that kill 10% or less of the dominant tree canopy. Smaller understory trees, shrubs, and forbs may be burned back to the ground line (Figure 3-2).

These are commonly low-severity surface and understory fires, often (but not always) with short return intervals of less than 25 years.

The stand at the right has been commercial thinned and underburned twice since 1980.

Figure 3-2. Example of a non-lethal fire in a managed stand northeast of Bonners Ferry.

Figure 3-3. Northwest Peak Fire -- A stand replacing or crown fire in action. This photo illustrates lethal fire conditions.

Lethal fires - fires that kill 90% or more of the dominant tree canopy are termed "stand-replacing" fires (Figure 3-3). Lethal fires frequently burn with high severity and are commonly (not always) crown fires.

In general, lethal fires have long return intervals (140 to 250+ years apart), but affect large areas when they do occur.

Local examples would be the Sundance and Trapper Peak fires of 1967 that burned over 80,000 acres in a short time period

Figure 3-4 shows conditions that are typical after a stand-replacement or lethal fire. Notice that the entire duff (organic) layer was consumed by the fire. Until grasses and forbs become reestablished, the soil, ash cap and associated nutrients are exposed to the elements and at risk from erosion processes.

Post –fire rehabilitation costs to mitigate erosion often exceed $5000 per acre (Burned Area Emergency Rehab Plan, 2002)

Figure 3-4. Post-fire conditions caused by a lethal fire.

3.4-B. Humans in the Mission Brush Ecosystem

B-1) Early Native American Influence

Human influence has likely been felt in the Mission Brush area for centuries. Archaeological research on the Kootenai River suggests that the Kootenai Indians have inhabited parts of the landscape for at least 3,000 years, and probably much longer (Choquette and Holstine, 1980).

The Kootenai Indians inhabited a territory that included the entire drainage of the Kootenai River in Canada and the United States. The area between the Montana-Idaho border and the summit of the Selkirk Range, and between the International Boundary and the divide between the Kootenai and Pend Oreille drainages was part of the territory of the Lower Kootenai (Chatters, 1992).

The Lower Kootenai Indians burned parts of the ecosystem to promote a diversity of habitats. They tended to burn during different times of the year, sometimes in the early spring or summer, while at other times in the fall after the hunt and berry-picking seasons were over. Hardly ever did they purposely burn during mid-summer when the forests were most vulnerable to catastrophic wildfire. Often the Indians burned selected areas yearly, every other year, or as long as five years (Chatters, 1992).

B-2) European Settlement and Recent Influences

Trappers, miners, farmers and ranchers settled in the Kootenai Valley during the early to mid 1800’s. During this period, railways, logging, wetland conversion to agricultural fields, and clearing of private lands were common activities. Larger fires in the county included the 1890’s fires, the 1910 fires, the 1945 Brush Lake Fire and the Sundance and Trapper Peak fires of 1967.

Since European settlement in the area, the landscape has undergone substantial changes. Three main factors have contributed to these changes: fire suppression, past logging practices, and the white pine blister rust fungus (Zack, 1995).

Fires and Firefighting Efforts

Firefighting effectiveness increased in the 1940's and the 1950's with additional fire suppression dollars, which allowed for the increased use of trained firefighting crews, smokejumpers, airplanes, helicopters, and bulldozers (Clark and Sampson, 1995).

Figure 3-5. Lookout Tower used for early detection

Figure 3-6. Aircraft dropping fire retardant

Figure 3-7. Helicopter with bucket used to drop water on "hot spots"

Figure 3-8. Hand Crew constructing fireline

Helicopters can drop water or fire retardant on "hot spots." Although they carry a smaller load than airtankers or SEATs, they are usually very accurate in pinpointing their target. Helicopters are also used to deliver crews, equipment, and supplies to remote areas.

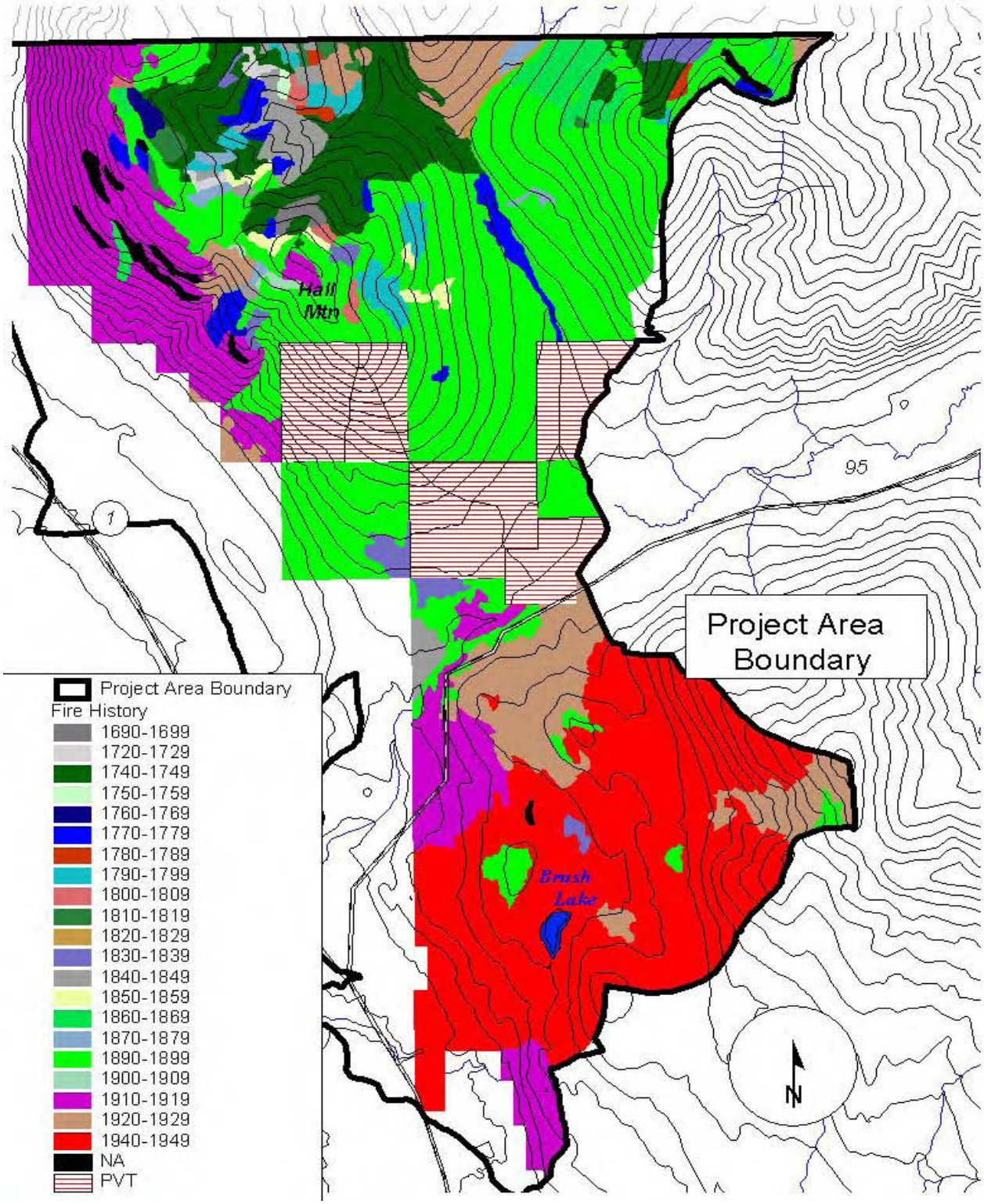
The basic tasks of building fireline and "mopping up" after a fire is controlled have not changed a great deal over time. Continuous studies of the science of fire and application of new technologies benefit land managers and incident management teams when they are establishing strategies and objectives during both wildfires and prescribed burning projects.

B-3) Fire Activity in the Project Area

The most recent stand-replacing fire in the Mission Brush project area occurred in 1945 and consumed about 4,800 acres of forest. The largest lethal or stand-replacing fire in the project area burned in the 1890's and consumed about 16,000 acres (Figure 3-9).

Since 1944, 49 lightning-caused fires have been recorded in the project area; only one of the fires grew larger than five acres.

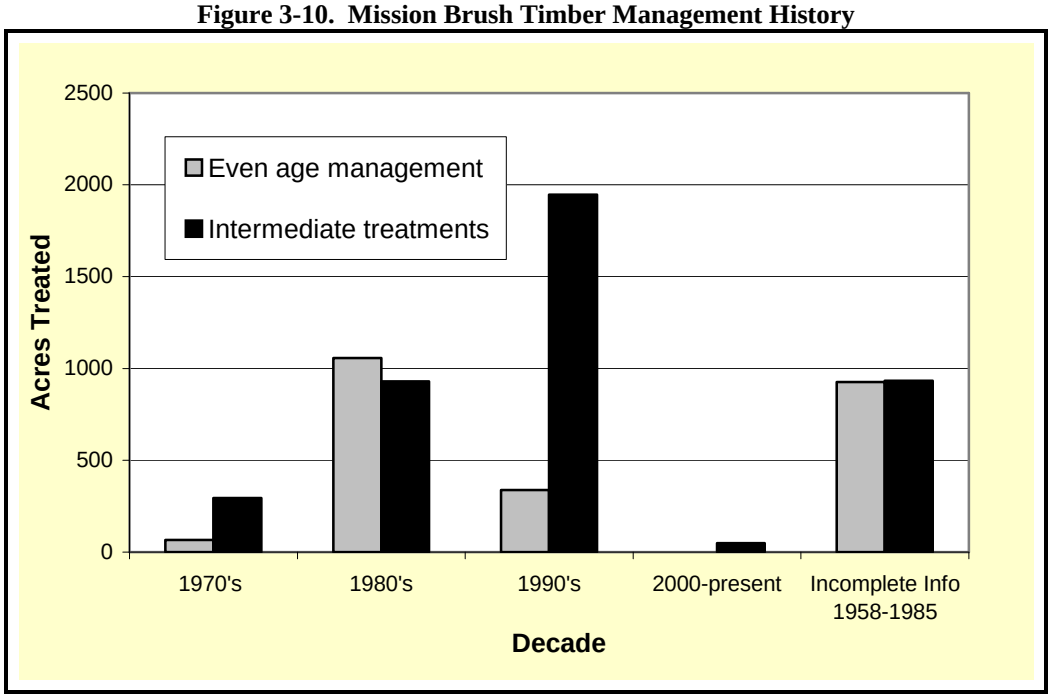
Figure 3-9. Mission Brush Fire History



3.4-C. Timber Management

According to the District's records, some timber harvesting occurred in the project area as far back as 1909, but most of the logging in the Mission Creek area occurred in the 1950's. The harvesting during this era was primarily economic selection of the most valuable species, including western larch, western white pine, ponderosa pine, and western red cedar. The extent of the harvested area was about 1400 acres of widely scattered logging. The majority of regulated[2] timber harvest began in the early 1960's and continued into the 1990's. Figure 3-10 summarizes the harvest activities and timber management trends in the project area.

Figure 3-10. Mission Brush Timber Management History



Appendix A includes a table which illustrates the National Forest timber sales that were sold and harvested from the 1950's to present. Information for some of the sales between 1958 and 1985 is incomplete. When the timber stand management information was converted from written records to computer-based data, some information was unavailable; for example the name of the sale might not have been listed although the acres and type of treatment and year completed were known. In other instances, the database contained the sale name, acres and year of accomplishment but lacked the activity code.

The relevance of the incomplete or unavailable data depends on what is lacking. The name of a particular sale would be of little value in evaluating the environmental effects of the harvest. While knowing the activity code (thinning, sanitation salvage, seed cut, etc.) is beneficial, the same knowledge can be gained through field visits, interpretation of aerial photography, or both. Incomplete or missing information of these types is not relevant to determining significant adverse impacts and the decision maker's ability to make a reasoned choice among alternatives. The effects of past timber harvest actions are accounted for in the assessment of the existing condition to the extent that the past actions are still affecting the particular resource(s) being considered.

Over the course of the past century, much of the adjacent private lands have been harvested. The harvest systems on these private lands have varied from even-aged regeneration cutting to economic selection cutting, depending on landowner objectives. The harvest activities on private land are included in Table A-2 in Appendix A and the effects of those activities are included in the existing condition and analysis of probable effects of National Forest management activities.

[2] Regulated Timber Harvest refers to the forest management principle of organizing and planning activities within a forest ecosystem keeping the following objectives in mind:

- maintaining a forest that is growing, vigorous and well distributed in size, age, and condition over the forest area in order to reduce the risk of fire, insects and diseases, and other elements of unhealthy conditions
- provide maximum opportunities for correlation with other uses such as recreation, wildlife, watershed and fisheries;
- providing a sustainable and silviculturally-sound source of wood products and economic benefits for the local and regional communities.

The ways in which past harvests have affected the Mission Brush project area are described above in sections A-3, 3.3-B and in Appendix A.

3.4-D. Insect and Disease Disturbance Factors

Most of the health concerns with these timbered stands can be tied to the overstocked or overcrowded condition of the stands. The densely stocked stands we see today are causing a general health and vigor decline in all tree species. There is too much competition for moisture, sunlight, and nutrients (Covington 1994).

The following list of major insects and disease agents are causing, or have the potential to cause, major disturbances within forest stands in the analysis area:

D-1) Root Diseases

Root diseases are common in the moist Douglas-fir, grand fir, and high elevation cool subalpine forests in the Northern Rockies Province. Several pathogens are involved, even in the same stand, so it is usual to consider them as a group. The main hosts are Douglas-fir and true firs (USFS 1999). Root diseases have apparently increased significantly over the past several decades, with the several-fold increase in host abundance (USFS 1999). Of particular concern is the dominance of Douglas-fir on all forest types in the project area. One of the most effective management tools is to reestablish resistant species on these sites, i.e., long-lived seral species (Williams et al 1989 and USFS 1999).

Major root diseases include: *Armillaria mellea* root rot, *Schweinitzii* root and butt rot, *Phellinus weirii* laminated root rot, and *Annosus* root rot (*Fomes annosus* or *Heterobasidium annosus*).

D-2) Bark Beetles

Bark beetles are considered the most consequential insects in western coniferous forests, where they kill millions of trees annually (USFS 1999). Most of this mortality is scattered widely throughout mature forests (Furniss and Carolin 1977). Mountain pine beetle, Douglas-fir beetle, spruce beetle, and fir engraver beetle are among the most important mortality agents of mature Idaho forests USFS 1999). Of these species, mountain pine beetle and Douglas-fir beetle are the most likely species of concern in the project area, given the relatively high number of stands where mature lodgepole pine ponderosa pine, and Douglas-fir are a major components.

Based on the rating system for mountain pine beetle in lodgepole pine developed by Randall and Tensmeyer (2000), there are nearly 960 acres in the project area that are rated either moderate or high hazard for mountain pine beetle. The hazard rating system for Douglas-fir beetle (Randall and Tensmeyer 1999) estimates there are nearly 1620 acres of either high or moderate hazard for Douglas-fir beetle in the project area.

Silvicultural control measures are the most efficient methods for managing the bark beetle populations. The most effective strategies for managing Douglas-fir beetle populations are preventive measures that involve reducing stand susceptibility to beetle infestations through maintenance of vigorous stands (Schmitz and Gibson 1996). Thinning stands of lodgepole and ponderosa pines will prevent or minimize beetle-caused mortality. Patch cutting in lodgepole pine stands creates a mosaic of age and size classes, which reduces the acreage of lodgepole pine that will be highly susceptible to beetles at one time (Amman et al 1989).

Bark beetles include: Douglas-fir beetle, fir engraver beetle, western pine beetle, mountain pine beetle, *Ips* beetle, and red turpentine beetle.

D-3) Stem and butt decays

Stem and butt decays include: cedar-laminated butt rot, cedar brown pocket rot, white pocket rot, pouch fungus, and Indian Paint fungus.

D-4) Foliage Diseases

The major foliage diseases include larch dwarf mistletoe and Douglas-fir dwarf mistletoe (Figures 3-11 and 3-12). Dwarf mistletoe plants cause the tree to form thick branching habits or witches brooms in the canopy. Over time, the width of the tree crown shrinks and the host tree dies. The parasitic plants reproduces by “shooting” sticky seeds out about 30 feet from the host

tree every summer and any susceptible trees in the understory are then infected and the cycle is then is the restarted. These parasitic plants are native components to the forest ecosystems, but human influences such as fire exclusion and partial cutting have served to increase the intensification, spread and severity of dwarf mistletoes to unnatural levels in many forest stands (IPNF Insect and Disease Handbook).

D-5) Stem Disease - White Pine Blister Rust

The main stem disease is white pine blister rust (Figures 3-13 and 3-14). Latin name *Cronartium ribicola*, is a pest (fungus) introduced from Europe. It was first discovered in western North America at Point Grey near Vancouver, British Columbia in 1921 on eastern white pine that had come from France as seedlings in 1910. By 1928, the rust disease had spread eastward and southward into Idaho almost to the limits of the western white pine forest type, which includes the analysis area. Over the past 82 years, blister rust and bark beetles have caused significant mortality in western white pine stands, increasing levels of standing and dead woody materials in these stands. White pine blister rust, plus bark beetle attacks, have accounted for the loss of the white pine and the white bark pine cover type from the western United States (Figure 3-15).

Natural resistance to blister rust is about four percent, with only a few individual trees surviving the disease. Losses, however, have decreased and will continue to decrease since the numbers of five-needle pines (white pine, white bark pine and limber pine) are decreasing across the landscape; however, the surviving trees show a natural resistance. Forest geneticists and silviculturists are using seed from superior individuals to grow semi-resistant pines for reforestation projects.

Figure 3-11 and Figure 3-12. Dwarf mistletoe on larch and Douglas-fir trees.

Dwarf mistletoes are small leafless parasitic plants dependent on conifer hosts for growth and survival. Dwarf mistletoe species that are widespread in the analysis area are specie-specific to their host tree – larch (left picture) and Douglas-fir (right).

Figure 3-13. Top kill from blister rust in a white pine tree.

Figure 3-14. Project Area Stand Conditions.

Stands in the project area that used to have a high component of western white pine are now typically dominated by Douglas-fir, grand fir and lodgepole in the overstory, with thick layers of cedar and hemlock in the understory.

Figure 3-15. Historic Range of Western White Pine

Native white pine populations have decreased by 95% due to white pine blister rust across its natural range in the West. Less than 2% of the project area is composed of stands where white pine is the dominant overstory tree.

Because of their relative intolerance of shade, seral species such as ponderosa pine, western larch and western white pine attain a dominant position in the stand only following wildfires, even-aged silvicultural systems (Figure 3-16), or through cultural treatments (thinning) favoring the species (USDA, 1990).

Figure 3-16. Example of a regenerated ponderosa pine / larch shelterwood cut (harvested in the mid-1980s) near the project area.

Larch, a component of dry forest types, is also a significant component of moist forests. Larch evolved with natural fire cycles. One can easily recognize burn patterns in the forest by looking for concentrations of larch. It depends on fire as an agent to expose mineral soil, reduce thick duff layers and create openings to germinate and grow in. Without fire, regeneration cuts, or pre-commercial thinning, larch would drop out of most stands and not maintain the role it had prior to European settlement and fire suppression (Zack, 1995).

Since European settlement in the area, the landscape has undergone substantial changes. Three main factors have contributed to these changes: fire suppression, past logging practices, and the white pine blister rust fungus (Zack, 1995).

Fire would have favored ponderosa pine, larch, and white pine because those species regenerate well in full sunlight, they have self-pruning lower branches and thick layers of bark to protect the tree from relatively frequent underburns and are long lived. Shade tolerant (trees that can grow under shaded conditions) such as subalpine fir and grand fir were thinned by root diseases, insects, and low intensity non-lethal fires. Large trees in patches would have dominated the landscape, with large patches of post-fire shrub/seedling/sapling stands (Zack, 1995).

3.4-E. Forest Habitat Type

The following forest types are unique in some way. These forest types are based mostly on their similarities in forest character, climate and moisture regimes, and natural disturbance processes including fire, insect and disease outbreaks, and weather events such as blow down and ice storms.

E-1) Dry Forests

These forest types consist primarily of Douglas-fir, ponderosa pine, and western larch. They represent over a third of the National Forest lands in the project area.

Prior to the 20th century, many stands in the dry forest types were burned frequently by low- or mixed-severity fire; occasional stand-replacing fire occurred in small patches as well. Where fires occurred at relatively short intervals (less than 25 years), they were mostly non-lethal.

All-aged structures were produced by non-lethal fire regimes, and even-age structures were produced by fire regimes with a combination of non-lethal, patchy, severe fire (Smith and Fischer 1997). On similar stands in western Montana, fires at mean intervals of less than 50 years account for the presence, development and maintenance of old growth ponderosa pine (Arno and others 1995).

Figure 3-17 shows a typical old growth ponderosa pine stand.

Notice the “in growth” of Douglas-fir and the heavy fuel buildup; a direct effect of removing the role of fire in dry forest ecosystems.

Figure 3-17. Conditions in the project area near Brush Lake.

Figure 3-18 shows the base of a ponderosa pine tree in the project area.

It has 23 fire scars on it from low severity fire events since the year 1640; indicating a rough fire return interval of 16 years.

Figure 3-18. Fire scars on ponderosa pine.

Based on field reconnaissance, the average fire return interval for the lower elevation dry site forests in the Mission Brush project area is estimated at 20 years, with a range of every 10 to 35 year intervals also represented (Grant, 1998).

E-2) Moist Forests

These forests occupy about 7500 acres of the project area and are dominated by a mixture of conifer species such as western larch, Douglas-fir, grand fir, lodgepole pine, western red cedar, western hemlock. Historically, white pine was a long-lived major species in this forest type, but has dropped out due to blister rust. Moist forests are common at mid-elevations on the north and easterly aspects in the mountains of northern Idaho.

These forests are very productive and prior to European settlement tended to accumulate large amounts of biomass (the collection of all the living plant in a forest) in the relatively long intervals (average 200+ years) between stand replacing fires. Sometimes, low-severity fire occurred two to three times as often as either moderate- or high-severity fire (Smith and Fischer 1997). Because pre-settlement intervals between severe fires were generally long in these forest types, the effects of fire exclusion are subtle. However, exclusion of low and mixed severity fire events over the past 70 years has reduced ecological diversity and increased homogeneity (stands of similar size, age, species composition, structure, etc.) across the landscape (Smith and Fischer, 1997).

E-3) Cold Forests

Cold-dry forests occupy about 2200 acres in the project area. They are located at higher elevations characterized by harsher and more restrictive growing environments. Consequently, the forest canopy is partially open in many of the mature stands of subalpine fir and Engelmann spruce. Younger stands are dominated by lodgepole pine or by a mixture of lodgepole pine, subalpine fir, Engelmann spruce, and some Douglas-fir.

Historically, stand-replacing fires occurred at average intervals ranging from 52 to 200 years or more. Stand-replacing fire occurred less frequently at high elevations than at the low elevations because of slower tree growth and less continuous fuels at high elevations (Barrett 1982; Green 1994). Low severity and mixed severity fires also occurred every 30 to 50 years on average (Smith and Fischer 1997).

3.4-F. Forest Composition

The composition of a forest changes over time. Historically, fire was the primary ecological process that determined forest composition. Recurrent, low intensity fires regulated competition for limited site resources (e.g., water and nutrients) by reducing shrubs and thinning out the understory shade tolerant tree species, such as grand fir, cedar, hemlock and Douglas-fir.

Aspen Colonies: Isolated colonies are scattered through the project area. All of the groves of aspen are showing the effects of being out competed by longer-lived shade-tolerant conifers such as Douglas-fir and grand fir.

Because of an effective national "Smokey Bear" campaign and current fire policies, most fires are now promptly extinguished. With such effective wildfire suppression, forests have become overstocked with shade-tolerant tree species. This condition has resulted in a general loss of vigor in all species, particularly the ponderosa pine and larch that require full sunlight to thrive.

The last major fire burned in the Mission Brush area in 1945. Since then, fire has in effect been removed from the ecosystem; in turn, forest composition has been determined mostly by fire suppression and timber harvest. As a result, changes in forest composition and structure have occurred in the Mission Brush area as displayed in Figures 3-17 and 3-22.

After the 1945 fire, hundreds of acres near Brush Lake were planted to ponderosa pine. The seedlings originated from the Sauvanac nursery near Missoula and the seed source was unknown. The ponderosa pine are of a genetic strain that is not adapted to the local climate, soil, and ecological conditions in the project area, and consequentially, most of the trees are dying from root diseases and bark beetles (Figure 3-19).

The ponderosa pine in this photo are not adapted to the ecosystem, they are dying from root diseases and bark beetle infestations (entomologist's and geneticist's reports in project file.) Consequently, the fuel loading and risk of a stand-replacing fire(s) are increasing each year.

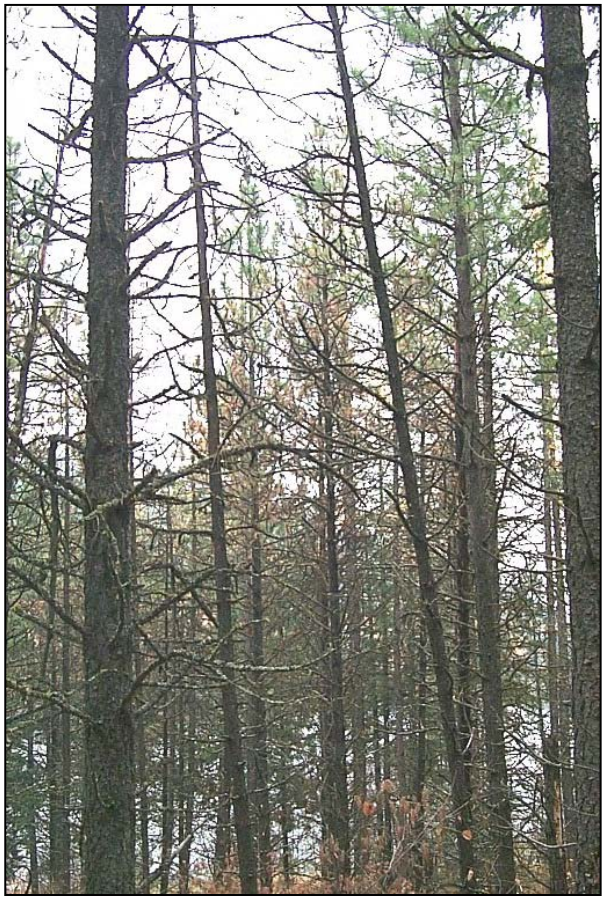


Figure 3-19. Genetically inferior "Offsite" Ponderosa pine near Brush Lake.

F-1) Broad Scale Comparisons

The following tables and figures are useful in broad scale planning when comparing habitat groups (Table 3-3 and Figure 3-20), tree species distributions (Figure 3-21), and the relative changes in the abundance of each tree species over time (Figure 3-22). Notice how the tree species composition in the Mission Brush project area relate to the larger Kootenai River sub-basin and how they are all on the same trend when compared to historical conditions.

Table 3-1 Table Existing Condition of Vegetation in the Project Area
Compared to the Kootenai River sub-basin

Habitat Types	Percent of Project Area (acres) Mission Brush Habitat Groups	Percent of Kootenai River Sub-basin (acres)
Dry Forest	38%	13%
Moist Forest	45%	49%
Moderate Subalpine	16%	29%

Figure 3-20. Comparison of Existing Distribution of Forest Types within the Project Area and the Kootenai River Sub-Basin

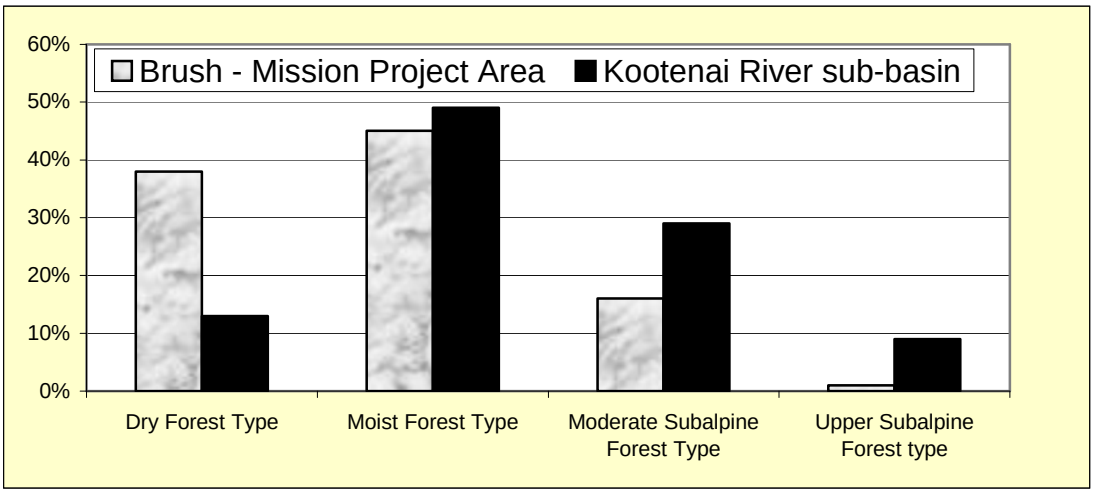


Figure 3-21. Historic vs. Current Forest Types - Mission Brush Project Area Species distribution from a historical perspective.

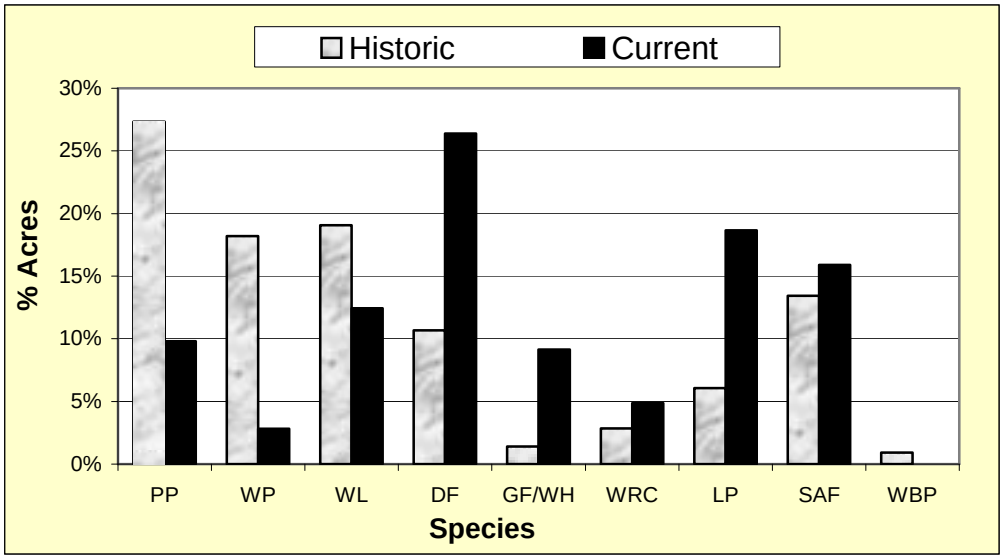
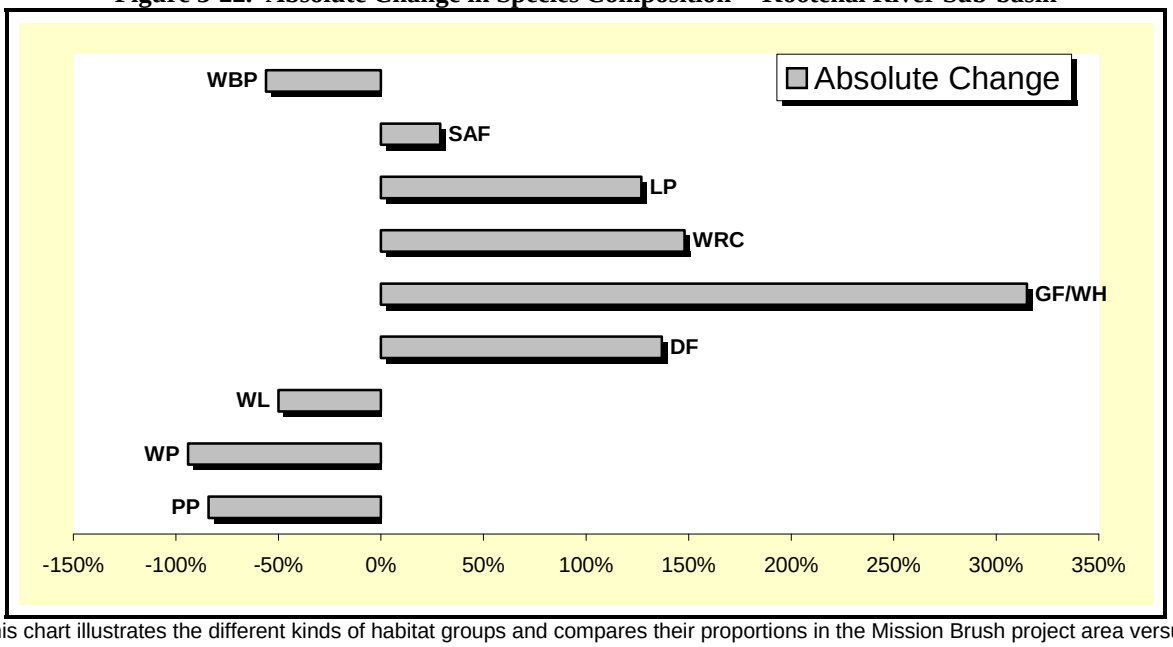


Figure 3-22. Absolute Change in Species Composition -- Kootenai River Sub-basin



This chart illustrates the different kinds of habitat groups and compares their proportions in the Mission Brush project area versus the Kootenai sub-basin. A positive value (right of 0%) represents an increase in the species, a negative value (left of 0%) represents a decline in the species. (WBP = White Bark Pine, SAF = Sub Alpine Fir, LP = Lodgepole Pine, WRC = Western Red Cedar, GF/WH = Grand Fir/Western Hemlock, DF = Douglas-fir, WL = Western Larch, WP = White Pine, PP = Ponderosa Pine)

Current species trends from the NZGA indicate a forest wide trend with the decrease in seral species (PP, WP, WL) and the increase in shade tolerant species (DF, GF, WH, WRC). All species are trending away from the Desired Future Conditions (DFC) listed in Chapter 1.

The composition of ponderosa pine, white pine, and western larch are well below estimated historic levels in the Mission Brush area. Historically, it is estimated that ponderosa pine was the major species on about 27% of the area, or about 4400 acres. Currently, ponderosa pine is the primary species on less than 10% (1560 acres) of the National Forest acres in the Mission Brush project area.

Prior to the introduction of blister rust, white pine was a major species on an estimated 18% of the forests in the area. Today white pine is a major species on less than 2% (500 acres) of the forests in the Mission Brush area.

Historically, western larch was the major forest species on an estimated 20% (3300 acres) of the forested landscape and is now the major species on about 12% (2,000 acres) of the forests in the project area. The most striking changes have occurred with respect to long-lived seral species -- ponderosa pine, western white pine, and western larch. These species have been replaced across the landscape by more shade-tolerant climax species -- Douglas-fir, grand fir, western red cedar, and western hemlock.

3.4-G. North Zone Geographic Assessment Findings

The North Zone Geographic Assessment (NZGA – Figure 3-23) defines parts of the Mission Brush project area as “Low Integrity/High Risk Landscapes.” Some of the specific findings that relate to the Mission Brush project area are:

- These landscapes have changed the most from historic conditions due to major losses of long-lived seral species (ponderosa pine, western larch, and western white pine).
- These landscapes contain large areas of forest types with high probability of major successional change in the next few decades.
- Douglas-fir is at an age where combinations of root diseases and bark beetles begin to create high mortality.
- Dense and multi-storied stands of Douglas-fir or true firs dominate dry habitat types.
- Current forests area dominated by shade-tolerant, and drought- and fire-intolerant species (grand fir, western red cedar, and western hemlock), and short-lived seral species (lodgepole pine and Douglas-fir).

- Natural fuels accumulations are causing an increase in wildfire risk.
- These landscapes are the most heavily altered from historic conditions and contain the greatest need and opportunity for large-scale forest vegetation restoration.

The management recommendations that relate to the Mission Brush project area are specifically focused on the restoration of long-lived early seral species (ponderosa pine, western larch, and western white pine).

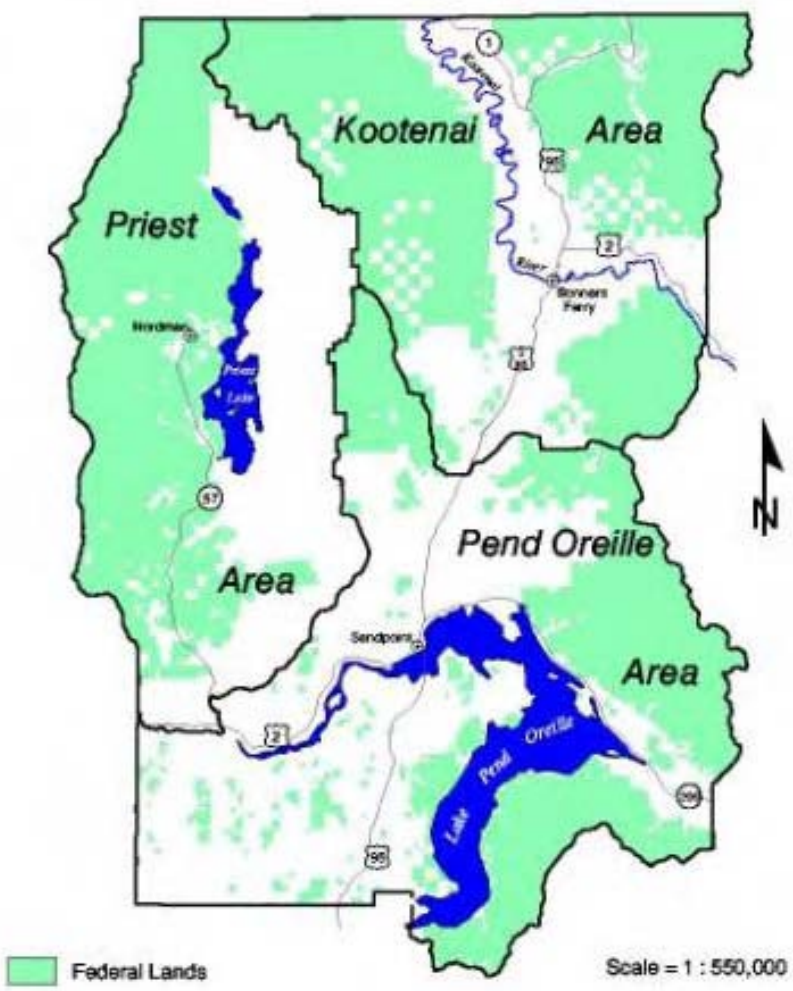
Some of these recommendations include:

- Use regeneration harvest and prescribed fire to create openings that will favor development of long-lived early succession tree species, including blister rust-resistant white pine.
- Use a variety of silvicultural methods (thinning and regeneration) and prescribed fire to sustain and favor long-lived early succession tree species where they are present.

Restoring long-lived early seral species would:

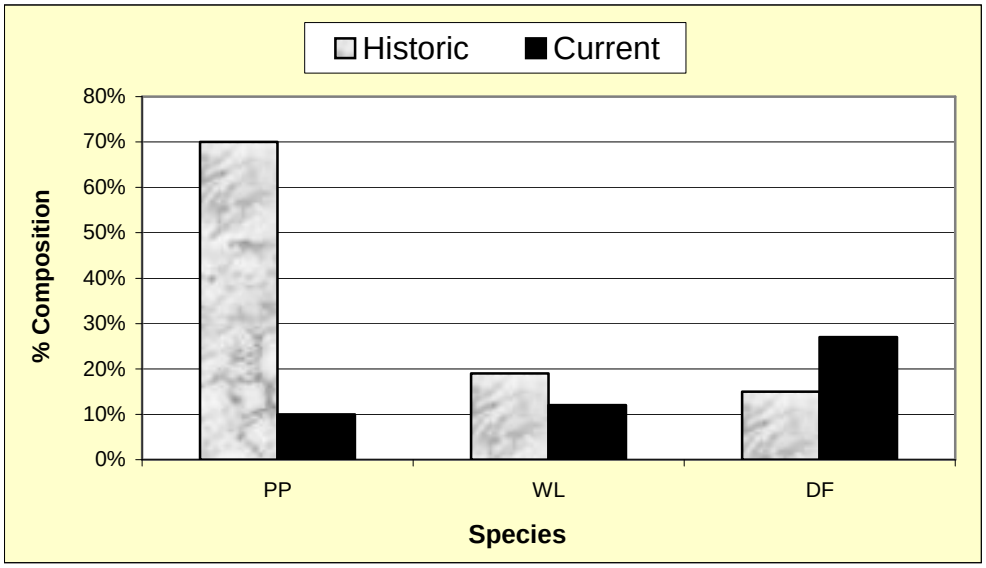
- Reduce the extent of drought and fire intolerant species (grand fir, western hemlock, and western red cedar) on sites where they are not well-adapted and likely drought stressed.
- Reduce the extent of short-lived early seral forest species (Douglas-fir and lodgepole pine) that are near the end of their pathological rotation age.
- Lower the risk of large, severe disturbances.

Figure 3-23. North Zone Geographic Areas



These changes are even more dramatic in the dry forest types, as shown in Figure 3-24 where it is estimated that ponderosa pine was the dominant species on 70% of dry forests historically, contrasted with the current forests where ponderosa pine is the dominant species on only 10% of these forests. On the other hand, Douglas-fir is the dominant species on 27% of the dry forest types, where it was about 11% historically. As a result, large-scale changes in forest composition have occurred in the project area, especially on dry forest types. The following is a summary of the changes in forest composition in the Mission Brush area:

Figure 3-24. Historic vs. Current Dry Site Species Composition: Kootenai Sub Basin and the Mission Brush Project Area



On Dry Forest Types:

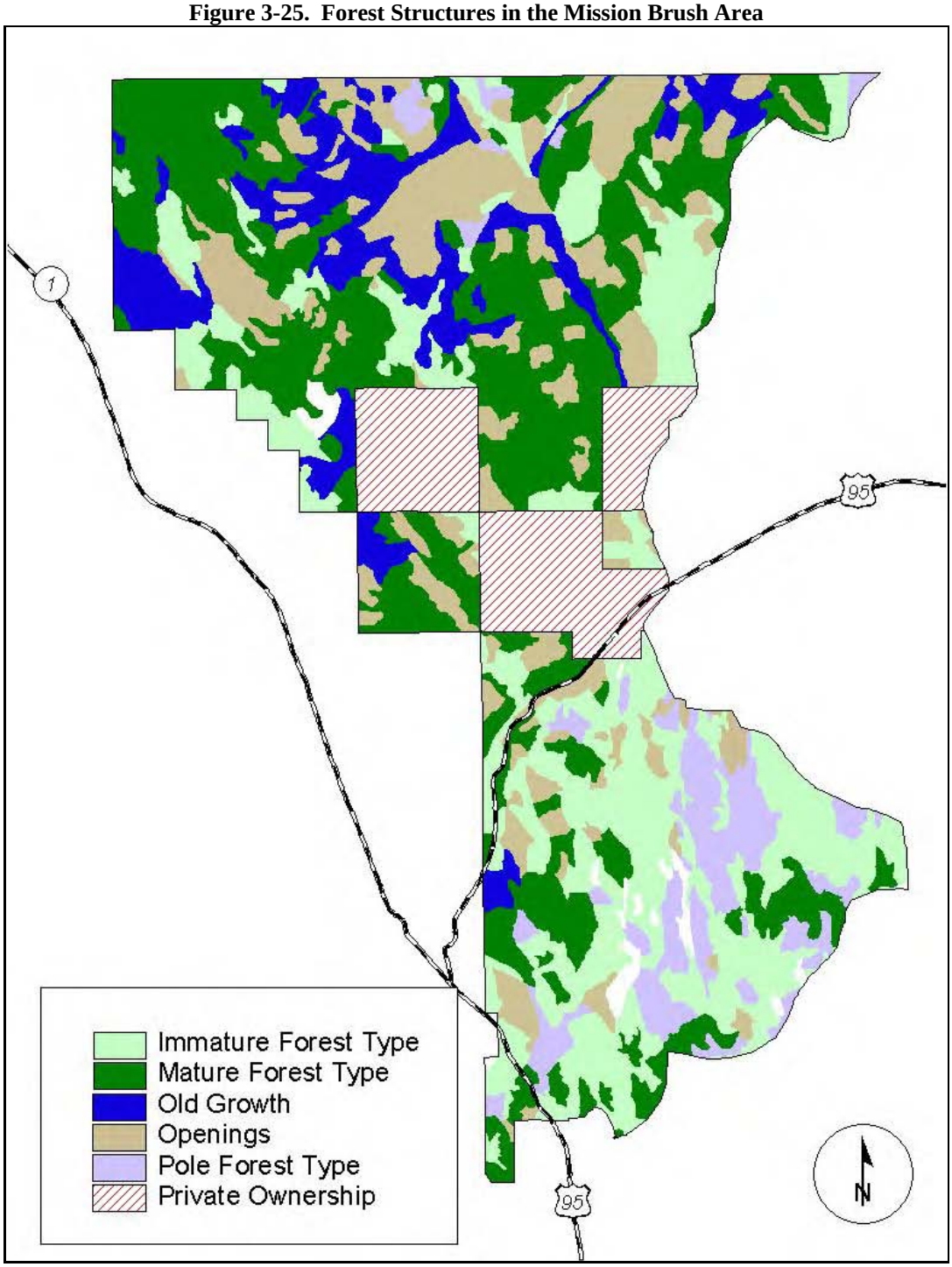
- Ponderosa pine has decreased from an estimated 70% to 10%
- Western larch has decreased from an estimated 19% to less than11%
- Douglas-fir has increased from an estimated 12% to 27%

These changes in forest composition have significant implications. Douglas-fir and grand fir, which now dominate the landscape, tend to be much less resistant to fire, insects, and disease than long-live seral species (ponderosa pine and western larch) that they have replaced. These species also tend to “hog” nutrients such as potassium in their foliage that trees need for disease resistance (Garrison and Moore 1998).

3.4-H. Forest Structure

Prior to European settlement, forest structure was determined mostly by fire. Fires served to break the landscape into various forested characteristics. For this analysis the forested landscape has been broken into the following structural classifications: 1) openings, 2) pole timber, 3) immature forests, 4) mature forests and 5) old growth. Figure 3-25 displays the current distribution of forest structures in the project area.

Figure 3-25. Forest Structures in the Mission Brush Area



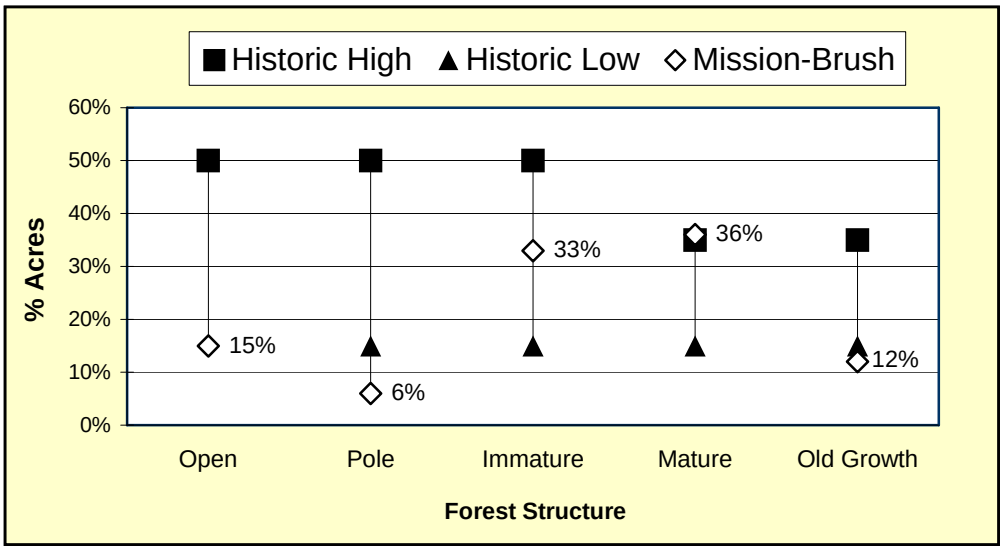
Once again, since fire has in effect been removed from the ecosystem, forest structure has been determined mostly by fire suppression and timber harvest. Figure 3-26 displays current forest structure compared to the estimated historic ranges (North Zone GA) of each structural class.

Current distribution of various forest structures compares to the historic in the following ways:

- Forested openings (15%) fall within the historic range (15-50%), on the lower end of the range
- Pole-sized timber stands (6%) fall slightly below the historic range (15-50%)
- Immature timber stands (33%) fall within the historic range (15-50%)
- Mature timber stands (36%) fall outside historic range (15-35%),
- Old growth timber stands (12%) fall below the historic range (15-35).

Additionally, landscape patterns have undergone substantial changes since European settlement. Based on an analysis of landscape patterns in the project area, the current average opening size is estimated at 34 acres versus the historic estimate of 690 acres (Behrens 2004), which represents a decrease in opening size of nearly twenty times.

Figure 3-26. Mission Brush Forest Structure: Historic vs. Existing



This chart compares current and historical forest structures on all forest types. The lack of openings and pole size stands indicate the need for more regeneration of seral species across the assessment area. The mature forest component (especially dry site stands at risk of drought, insect outbreaks and stand-replacing fire) need treatment in order to trend them toward Old Growth status.

The distribution of old growth forests varies across landscape scales. The range of old growth on the North Zone h been estimated at 15 to 35%. Currently, 14% of the North Zone forests are composed of old growth - below to slightly below historic levels. In the Kootenai River sub-basin, old growth forests total 17% of the forested landscape. The Mission Brush assessment area intersects OGMU 19 and 20. These OGMUs encompass about 16,125 acres of National Forest, and 1,778 acres or about 12% are included in the IPNFs old growth allocation. This is below the estimated 15 – 35% for the North Zone forests.

3.5 Supplemental FEIS Old Growth Review

3.5-A. Methodologies

The IPNF is currently using two independent tools to inventory and monitor old growth at the Forest-wide scale:

1) Forest Inventory and Analysis (FIA) data,
2) IPNF stand level inventory, with old growth status recorded in TSMRS database.

These two independent inventories use significantly different sample designs, and are administered and carried out by different people. FIA old growth estimates are based on a statistically sound, systematic sample of the entire National Forest, administered by the Rocky Mountain Research Station in Ogden, Utah. Our stand level inventory is based upon examination of selected individual forest stands for old growth characteristics. IPNF ranger district personnel carry out stand level inventory.

The two independent Forest Service old growth inventories produce remarkably similar results. Based on FIA data, the current estimate of the proportion of old growth on the forested portion of the IPNF is 12.85%. The 90% confidence intervals of this estimate are 10.55% to 15.27%.

The IPNF stand level inventory of allocated old growth is 12.1% of forested lands. The stand level inventory amount is well within the 90% confidence interval of the FIA inventory.

From a statistical perspective, at the 90% confidence level, the two numbers are not significantly different. Together, these two inventories offer compelling evidence that the IPNF is meeting Forest Plan standards for the amount of old growth to be retained.

The District annually updates the TSMRS database as stands that were previously not field reviewed are examined. Based on these annual updates, the District now has 65,853 acres (16.7%) of allocated old growth and potential old growth (2004 Monitoring Report). Based on FIA data 19.2% of the forested portion of the Bonners Ferry Ranger District is old growth (90% confidence intervals of this estimate are 12.9% to 25.8%). Additionally, based on our project level review the District is maintaining over 12% allocated old growth in Old Growth Management Units (OGMU) 19 and 20.

3.5-B. Project Level Old Growth Review

A three-step process was used to assess the accuracy of database as it relates to our old growth allocations in the Mission Brush project area.

First, all allocated old growth stands (codes 9 and 11) were reviewed to determine if they do indeed meet standards.

Second, all stands coded as recruitment (code 8) were also reviewed to determine whether they meet standards.

Third, any stand with a size class origin year of 1880 or earlier was reviewed to determine if it met old growth standards.

Each stand that was reviewed was measured against the Green and others 1992, corrected 02/2005) standards for the appropriate old growth type code. The *minimum* standards for the old growth forest types found in the Mission Brush project area are described in Table 3-4, below. These minimum criteria were used as a screening device to select stands that may be suitable for management as old growth.

Table 3-2 Minimum Standards for Old Growth Forest Types in Project Area

Forest Type	TPA	Large Tree Size (dbh)	Age of Large Trees (years)	Basal Area (ft^2/acre)
Douglas-fir	8	21”	> 150 years	40
Grand Fir	10	21”	> 150 years	80
Cedar and Hemlock	10	21”	> 150 years	120
Subalpine fir	10	17”	> 150 years	80

The date of the latest exam was noted and any significant disturbances that could have changed the character of the stands were noted. Any stands coded as allocated confirmed old growth (code 9), or allocated potential old growth (code 11), with a harvest activity code in the database *since* the most current stand exam was field examined in 2005 (project file document OG-08). Stands that still meet the IPNFs old growth standards were retained in the District’s allocation. Previously harvested stands that did not meet IPNFs old growth standards were removed from the allocation.

Wildfire and insect and disease outbreaks are other factors that could have potentially changed the condition of our allocated growth stands. There have been no wildfires of any significance within the project area since these stands were last field reviewed and annual Region One insect and disease aerial flights revealed that there have been no significant outbreaks in our old growth stands that would have altered conditions enough to warrant a change in their allocation. (project file documents Fire -16, D7 Fire Data, and OG-09, Mission Brush Old Growth Insect and Disease Damage.)

Based on our review of the old growth data in OGMU 19 and 20, and field exams in the spring and summer of 2005, some changes in the allocation were made, but the overall allocation actually increased slightly from 1,778 acres to 1,965 acres (Table 3-5). All of the stands included in our allocation have been field reviewed (project file document OG-08)

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Table 3-3 Old Growth Allocations in Management Units 19 and 20

OGMU[3]	2004 FEIS Acres	Updated Acres	%OGMU (2004 FEIS)	%OGMU (Updated)
19	483	397	15	13
20	1,295	1,568	10	12

3.5-C. Forest Vegetation Conclusions

- Dry forests have experienced the greatest ecological change

Important ecological changes in the Mission Brush area have occurred with fire suppression and widely scattered timber harvest over time. Given the average fire return interval of approximately 20 years for these forests, portions of the project area could have burned two to four times over since 1945. There were 49 lightning caused fires on record that were immediately suppressed in the project area since 1945, signifying the potential for numerous fires and landscape cover changes over the past 55 years.

Additionally, early century selective logging removed some of the larger diameter ponderosa pine and western larch. A historic study of some of these types in western Montana illustrates some of the changes that have occurred in our dry forests. Prior to 1900, these western Montana sites may have supported an average of 27 trees per acre, with ponderosa pine and western larch dominating. Historically, these thick-barked pine and larch withstood frequent low intensity fires. Total density of trees greater than three inches diameter at breast height (DBH) averaged 43 trees per acre (TPA). In 1984 these sites in western Montana supported 211 TPA larger than 3 inches and Douglas-fir dominated every size class except the largest (Habeck 1985). Stands on similar forest types in the Mission Brush analysis area average about 300 TPA greater than 3 inches DBH.

[3] OGMU19 is 3,105 acres and OGMU20 is 13,020 acres. Both OGMUs combined total 16,125 acres.

- Western white pine is missing

Blister rust has taken its toll on western white pine throughout north Idaho. The Mission Brush area is no exception. This species was once a major component of the moist forest types. Now shade tolerant species such as Douglas-fir, grand fir, western hemlock, and western red cedar dominate areas where western white pine once thrived. These changes in forest composition have some potentially significant effects in today's forests. Conversion of tall, well-spaced white pine to low, densely stocked fir results in hazardous fuel ladders. Thus, significant changes in fire behavior are also characteristic of modern-day, moist interior forests. Such changes in fire behavior threaten future fire control and place neighboring forest ecosystems at risk (Harvey 1994).

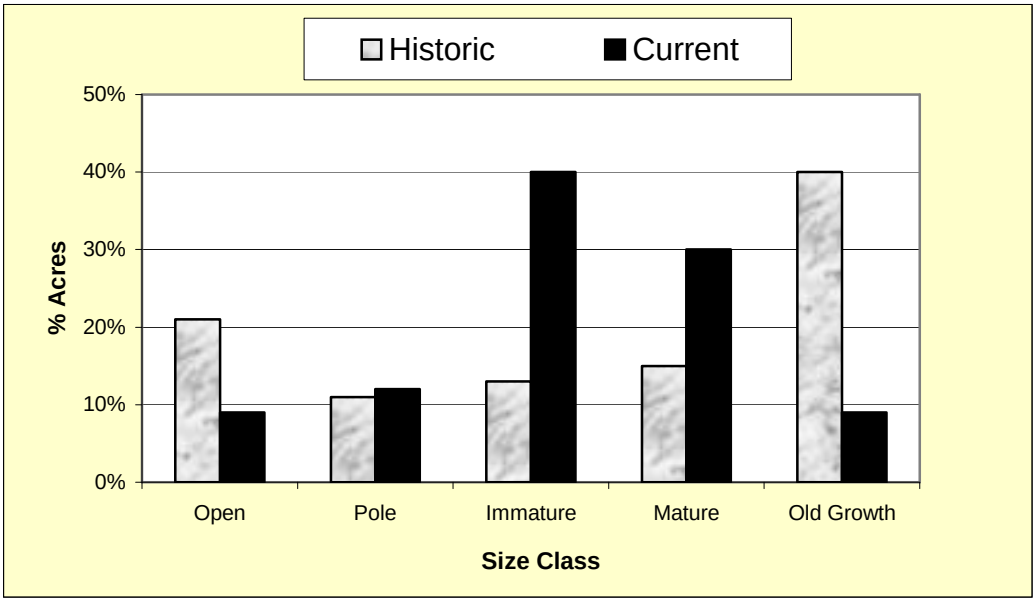
The amount of old growth in the Mission Brush area falls below the historic range, and the composition, structure, and distribution of old growth has changed

Most of the old growth in the assessment area is located on moist forest types in riparian areas where western red cedar and western hemlock are the dominant species. However, the amount of old growth in dry forest types is lower than estimated historic levels (Figure 3-27).

Based on estimates from the North Zone GA, 40% of these dry site forests were in the old growth category historically, with a range of 25-55%. Currently, about 9% of the dry forest types within the Mission Brush area are classified as old growth, or recruitment old growth, which is within the estimated acreage. The important thing to remember is that the composition and structure of these stands has altered with the absence of fire or management, placing the very stands we are trying retain on the landscape at risk of damage from insects, diseases and stand replacement fires. To meet Forest Plan minimum requirements from, dry-site old growth stands must be at least 150 years old and contain at least 8 trees per acre (TPA), greater than 21 inches in diameter (Green and others 1992, corrected 02/2005).

The dry-site old growth stands in the project area meet these requirements, however, they also tend have thick understories from years of fire suppression which raises the demand for limited moisture and nutrients and in turn, stresses individual trees and the collectively the entire stand (see Ch 3).

Figure 3-27. Dry Forest Structure (Size Class) -- Historic vs. Current



This chart compares current and historical forest structures on dry forest types. The lack of current openings indicates the need for more regeneration of seral species. The difference in acres of openings, immature, mature and old growth size classes indicate the need to be adjusted in order to trend them toward old growth size classes, species composition and structure that would be more resistant to disturbance.

3.5-D. Desired Conditions

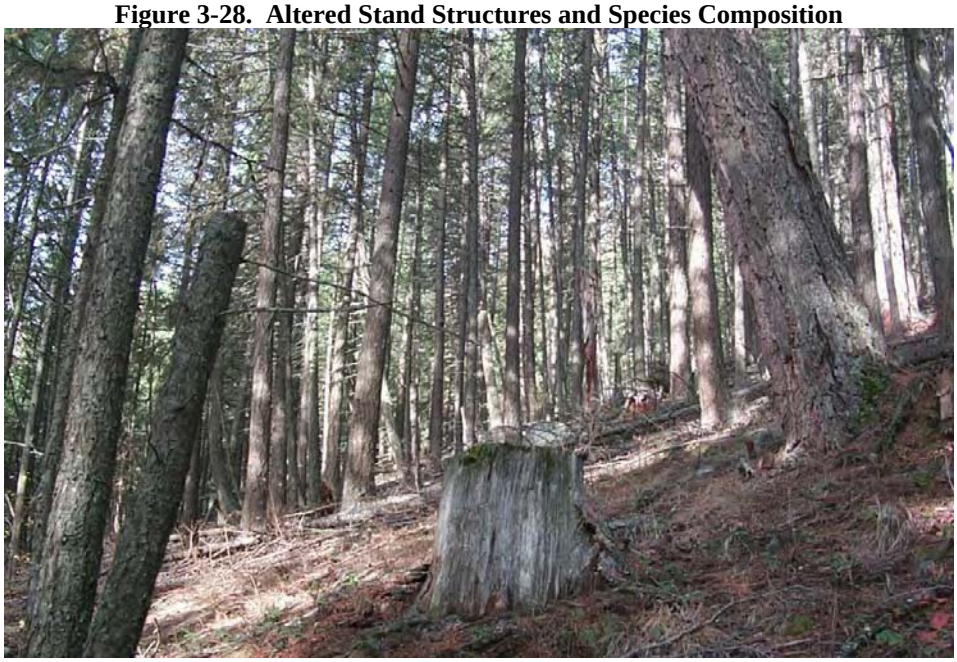
Two striking changes of dry forests have occurred in recent times.

Formerly, recurrent low intensity fires regulated competition for limited site resources (e.g., water and nutrients) by eliminating fire-intolerant trees. With effective exclusion of underburning fires in this century, dry forests quickly became overstocked, exceeding their moisture-limited productive potential.

In the absence of fire, native insects and pathogens regulate stocking by killing susceptible individuals and species. Formerly, frequent underburning fires prevented excess accumulation of carbon and storage of nutrients in woody biomass via consumption and release of nutrients. With the exclusion of fire, organic residues have accumulated as have standing live and dead fuels. The effectiveness of fire prevention and suppression in dry interior forests in recent years has permitted greatly increased ground fuel accumulations and stratified fuels (both living and dead) to the point where many fires can no longer be contained or confined (Harvey et al, 1994).

Figure 3-28 is a photograph that represents stand conditions on dry forest types within the Mission Brush project where fire has been excluded for over 70 years and some selective harvesting occurred in the early 1920's. As a result, Douglas-fir has replaced ponderosa pine as the dominant species and down woody fuels (larger than three inches in diameter) have built up beyond the levels recommended by Graham et al (1994).

Figure 3-28. Altered Stand Structures and Species Composition



Early 1900 partial cutting of the largest ponderosa pine and larch in some areas left shaded openings in the forest. These shaded conditions favored Douglas-fir regeneration – trending stand species and composition away from historical values.

Figure 3-29 is a picture of a dry forest stand in the project area near Brush Lake. Notice the "in-growth" of Douglas-fir and the heavy fuel buildup of pine needles and bark scales around the base of the tree. This arrangement of fuels increases the chance of a lethal crown fire and poses a serious hazard with respect to fire fighter safety. These ladder fuels are one direct effect of removing the role of fire from dry forest ecosystems.

Figure 3-29. Example of fuel buildup near Brush Lake.

D-1) Conditions in Dry Forest Types

The BEHAVE model predicts that a fire burning under normal summer conditions in this type of stand would have fireline intensities over 500 BTU/foot/second and flame lengths over eight feet. This type of fire would present serious control problems, including torching out, crowning, and spotting. Control efforts at the head of the fire would probably be ineffective (Roussopoulos and Johnson 1975). The majority of large-diameter trees in this stand would not survive this type of fire (Figure 3-29).

Forest Stand - The stand shown in Figure 3-30, about 15 miles southeast of the Mission-Brush project area, is located on the same habitat type as the stand in Figure 3-29. This stand was thinned in 1974 and underburned in 1978. A commercial thin and group selection harvest was conducted in 2000 and the stand was underburned again in the spring of 2002. Ponderosa pine is the dominant species in this stand with lesser amounts of western larch and Douglas-fir.

Based on fire behavior predictions using the BEHAVE model, a fire burning under normal summer conditions in this type of stand would have fireline intensities of about 8 BTU/foot/second and flame lengths of just over one foot. This type of fire could be fought with personnel using hand tools at the head of the fire, or the flanks (Roussopoulos and Johnson 1975). The majority of large-diameter trees in this stand would survive this type of fire.

Figure 3-30. Photo of a managed ponderosa pine stand.

Figures 3-28, 3-29, and 3-30 display how contrasting styles in management can drastically change the development of our dry forest stands. However, Figure 3-30 more closely represents a picture of the types of stands that would meet long-term management objectives on dry forest types across the Mission Brush landscape.

1) Forest Plan Direction

Site-Specific
The IPNF Forest Plan provides direction for all resource management programs and resource activities on the IPNF. Some of the directions that apply specifically to the vegetation resources within the Mission Brush Project Area are listed below. (USDA 1987, pp. II-31-34, II-38-39)

Provide for a diversity of plant and animal communities.
Provide efficient fire protection and fire use to help accomplish land management objectives.
- Manage the forest resources to protect against insect and disease damage.

General Project Design Features
Many Forest Plan Standards are applicable to the general design of the proposed action. Standards that apply to vegetation resources are listed below. (USDA 1987, pp. II-32-34, II-38-39)

- 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.
- 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 [through fire] 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.

3.6 Forest Aquatics

3.6-A. Regulatory Framework

The regulatory framework governing management of watershed and fisheries for the analysis is based on:

- National Forest Management Act
- Endangered Species Act
- Clean Water Act and amendments.
- State of Idaho's implementation of the Clean Water Act
- Rules Pertaining to the Idaho Forest Practices Act (Title 38, Chapter 13, Idaho Code, 2000)
- Executive Order 12962 (Recreational Fishing)

The National Forest Management Act (NFMA) (1976) requires that the Forest Service manage for a diversity of fish habitat to support viable fish populations (36CFR219.19). Regulations further state that the effects on these species and the reason for their choice as management indicator species be documented (36CFR219.19(a)(1)).

Section 7 of the 1973 Endangered Species Act (ESA) includes direction that Federal agencies, in consultation with the U.S. Fish and Wildlife Service, 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.

Under the authority of the Clean Water Act, the Environmental Protection Agency and the states must develop plans and objectives that will eventually restore identified stream segments of concern. The Idaho Department of Environmental Quality's (IDEQ) latest listing includes Brush Creek, Zion Creek, Hall Creek and Mission Creek as segments of concern regarding stream temperature (P.F. document STRM-05 IDEQ 1/17/06 News Release and associated information). The requirements of the INFS amendment to the 1987 IPNF Forest Plan, as well as other specific design features of this project would prevent or mitigate any activity that could potentially increase stream temperatures (see Appendix B, INFS standards and guidelines; Appendix C, Best Management Practices; and Chapter 2 section 2.8, Watershed and Fisheries Features).

The Forest Service has agreements with the State to implement Best Management Practices or Soil and Water Conservation Practices for all management activities. Proposed activities will comply with the guidelines in the Soil and Water Conservation Handbook (Forest Service Manual 2509.22), which outlines Best Management Practices that meet the intent of the water quality protection elements of the Idaho Forest Practices Act.

Executive Order 12962 (June 7, 1995) states objectives "to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities by: (h) evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order."

3.6-B. Methodology

B-1) Literature and Office Review

The assessment of existing condition is critical to an environmental analysis because it describes the current condition of the project area and provides a basis for comparing the effects of management alternatives. Information for the watershed and fisheries analysis was compiled using data from the North Zone Geographic Assessment (USDA draft in progress). Additional information was gathered from district fish and hydrology files, historical records, aerial photographs, and published scientific literature.

B-2) The WATSED Model – Supplemental Information

WATSED Model Limitations

*The discussion of analysis methodologies needs to include appropriate discussion of the limitations of the computer-generated WATSED model. (*Direction from the Ninth Circuit Court *Lands Council v. Powell*, 395 F.3d 1019 (2005Amended Opinion))

Relationship of the Analysis to the 2004 FEIS Analysis

The Methodology section explicitly explains the limitations of the models used for analysis within the project area. It also explains other methodologies and references used to assist in the analysis.

Changes between the FEIS/ROD and the Supplemental FEIS

Further clarification of the appropriate uses and known limitations of the model are provided to help the public and the decision maker better understand this model and how it is used in the overall aquatics analysis for this project. This information is summarized here, with more detailed explanation in section 3.6-c.

WATSED Model Design and Uses

The watershed response model, used on the IPNF is designed to:

- Address the cumulative effects of timber harvest operations, roads, and fire.
- Accounts for drought or flood years and rain-on-snow events when those phenomenon are part of the long-term climatic record for a region.

It does not attempt to analyze the effects of

- Grazing, or
- Mining (other than vegetation removal and road construction), or
- Other non-forest practices.

It does not attempt to simulate

- Individual or episodic storm events, drought or flood years, or
- The event-based response to individual events, including "rain-on-snow" events.

WATSED was designed to objectively compare relative differences between alternatives in terms of changes in trend, risks, and regimen; rather than to predict precise sediment and water yields that might occur as a result of stochastic events or non-forest related actions.

B-3) WATSED Validation Monitoring

The most recent WATSED Validation Monitoring was conducted for the 1999 and 2003 Forest Plan Monitoring and Evaluation Reports. Data has been gathered from three validation-monitoring watersheds (Halsey Creek and Big Elk Creek on the Coeur d'Alene River Ranger District and Long Canyon Creek on the Bonners Ferry Ranger District).

This information has been analyzed for the purpose of comparing assessments and calculations to the WATSED sediment prediction model. The 2003 report updated the 1999 report and included information on these streams for the following years:

- Halsey Creek, 1984 through 2003;
- Big Creek from 1988 through 2003; and
- Long Canyon from 1985 through 2003.

The 1999 report concluded, "The findings from the three sets of comparisons indicate that the WATSED measured responses in terms of the three watersheds are within a reasonable range. They also suggest that natural sediment loads, both measured and predicted are close, with the outstanding exception of Halsey Creek. In two cases, the recovery relationships for predicted suspended loads appear to be higher than expected or measured." (IPNF Monitoring and Evaluation Report for 1999, pg 33)

The 2003 report stated, "In Halsey and Big Elk Creeks, substantial differences between estimated sediment delivered from the WATSED model and measured total sediment yields continue to be evident. The divergence could be related to over-estimations by WATSED, or from sampling error related to inadequate timing or frequency of bedload measurements in these watersheds. The pattern of consistent overestimates in both watersheds suggests a systematic error may be in place. These will be investigated so that either the sampling techniques or the model calibration can be adjusted for more consistent results." (IPNF Monitoring and Evaluation Report for 2003, page 41)

In Long Canyon Creek, the WATSED estimates are much closer to the measured values for sediment, peak flows, and duration of runoff. The stream flow estimates from WATSED and measured flows are consistent with each other. (IPNF Monitoring and Evaluation Report for 2003, pgs 41, 44)

3.6-C. WATSED Analysis

The anticipated sediment and water yield modification for the Mission Creek watershed were estimated from the methods documented in the R1/R4 Sediment Guides (USDA Forest Service 1981) and the WATBAL Technical User Guide (Patten 1989). The version calibrated for the Idaho Panhandle National Forests, known as WATSED, is an analysis tool that spatially and temporally organizes typical watershed response relationships as a result of forest practices. The estimated responses are combined with other sources of information and analyses to help determine the findings of probable effects.

WATSED estimates a series of anticipated annual values over a period of years. The model predicts an estimate of the most likely mean annual sediment loads (reported as tons per square mile per year), and the expected sediment load modifications over time. The estimate of additional loading is expressed as a percent of the "natural" (i.e., historic mean load prior to significant development activities) sediment load, which is based on the history of disturbances and climate patterns in the watershed. In this analysis, the existing condition represents the year 2003, which is prior to any anticipated disturbances related to the proposed activities.

The estimates of sediment and peak flow reflect how watersheds with similar conditions and landtypes have responded over time to a similar history of disturbance. WATSED does not evaluate increases in sediment and peak flows specifically resulting from "rain-on-snow" events or other stochastic events, nor does it attempt to estimate in-channel and stream-bank erosion. WATSED is not intended nor designed to model event-based processes and functions, or specific in-channel responses. It does, however, incorporate the results of those processes in the calibration of its driving coefficients. The Idaho Panhandle National Forests frequently validates the WATSED coefficients and estimates using long-term monitoring stations across the forest.

The forest management activities used to calibrate the model include standard BMPs and Soil and Water Conservation Practices; therefore, standard BMPs and Soil and Water Conservation Practices are necessary requirements for maintaining an effective confidence level in the model's use. Non-standard BMPs, management or natural disturbances not related to forest practices, and site-specific non-standard BMPs must be integrated into the final analysis to fully determine watershed response.

WATSED was designed to address and integrate a vast and complex array of landtypes and disturbances within the context of a watershed and organize the evaluation according to rule sets established by the author and cooperators. In the case of WATSED, the rule sets reflect watershed processes and functions based on research, data, and analyses collected locally and regionally. Forest Plan monitoring reports (USDA Forest Service 2000, 1999, and 1998) describe how the calibration and validation of WATSED has been an annual process on the forest and where changes have been made. However, the model also includes simplifying assumptions, and does not include all possible controlling factors. Therefore, the use of WATSED is to provide one set of information to the technical user, who, along with a knowledge of the model and its limitations, other models, data, analysis, experience and judgment must integrate all those sources to make the appropriate findings and conclusions.

For the WATSED analysis, the Mission Creek watershed was divided into five sub-watersheds; the West Fork of Mission Creek, the East Fork of Mission Creek, Zion Creek, Main Stem of Mission Creek and Lower Mission (Figure 3-31).

3.6-D. Level 1 Slope Stability Model (LISA)

The relative stability of natural slopes in the Hall Mountain area were assessed using the LISA computer program as described in the Level I Stability Analysis (LISA). Documentation for Version 2.0 (Hammond, et al., 1992). LISA is designed as a tool to help estimate the relative stability of natural slopes or landtypes. LISA does not simulate the actual number of failures, nor the size or location of individual failures. The probabilities of failure estimated by LISA provide a relative comparison of the potential for failure on different slopes and different landtypes during a specific-sized storm event.

For this project, site-specific soil, cover type and landslide data was collected (project file). Model outputs will be used to assess the relative increase in the probability of failure after timber harvest for a specified area. The time frame represented in this model is an approximately 3 to 15 year period after timber harvest. This is the time when there is the greatest potential for landslides; new growth has not yet fully established, and old tree stumps and roots have begun to decompose and the root cohesion is the lowest (Jim Nieman, LISA Model memo, undated, project file) (see project file for more information).

3.6-E. Field Reviews

The main stem, East Fork and West Fork of Mission Creek were surveyed during the 1996 field season. A modified version of the R1/R4 fish and fish habitat inventory (Overton et al 1997) was conducted. Additional stream information was collected to

determine stream channel types (Rosgen, 1996), cross section profiles, woody debris composition and stream temperature. Existing and potential in-channel and stream-bank erosion sites were also documented during this survey (project file).

A roads analysis was completed in March 2002. Additional road condition surveys were conducted in the summer of 2002 to prioritize road improvement, road obliteration or road storage needs (project file).

3.7 Watershed Description and Characterization

The project area is located within two 6th level watersheds, the Kootenai Valley composite watershed and the Mission Creek watershed. The Kootenai Valley composite watershed is the reach of the Kootenai River from its confluence with Deep Creek north to the Canadian Border. The Brush Lake area and the Hall Mountain area are located within the Kootenai Valley composite watershed. The Mission Creek watershed originates in Canada with the East and West Forks of Mission Creek. As it drains into the United States, Zion Creek is the next main tributary until Mission Creek flows onto the Kootenai Valley.

The analysis area is approximately 31,350 acres in size and was subdivided into manageable watershed units for analysis. Three main areas of analysis were delineated based on 6th and 7th level watershed boundaries and the unique geologic and hydrologic characteristics of the area. For ease of discussion these three areas will be referred to as the Mission Creek watershed (19784 acres), the Hall Mountain area (6634 acres) and the Brush Lake area (4839 acres).

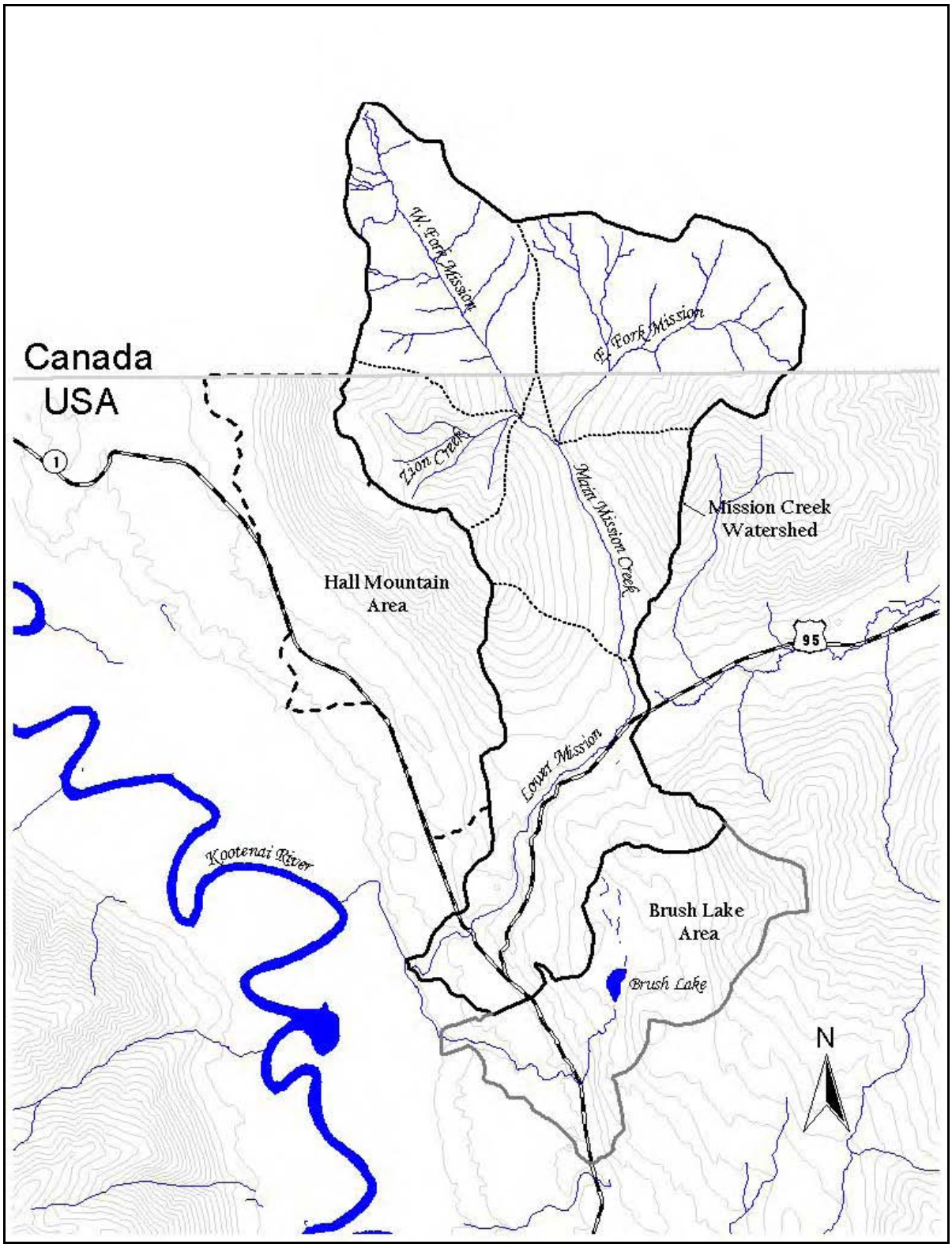
The Kootenai River Basin has experienced several glacial advances and recessions as well as tectonic forces and volcanic eruptions that have created the landtypes that exist today. Within the Hall Mountain and Brush Lake Areas and the Mission Creek watershed, the landtypes consist mostly of glaciated mountain side slopes underlain by hard, meta-sedimentary rocks (rock formed from sediments that has gone through metamorphic changes) or granitics (mostly within the Brush Lake area). Soils have formed from volcanic ash influenced loess overlying glacial till. Mass failure potentials and sediment delivery potentials range from low (Brush Lake area and side slopes within Mission Creek drainage) to high (south end of west facing slopes of Hall Mountain).

3.7-A. Sensitive Landtypes

Sensitive landtypes are defined as those with high potential for mass erosion, surface erosion, and high or moderate potential for sediment delivery. These are classified by the Idaho Panhandle National Forest land system inventory (project file). The sensitive landtypes within the project area include those with moderate and high sediment delivery potential (landtypes 255, 265, 250, 102, 103, 104) and high mass failure potential (landtype 250,106). Full descriptions and maps of sensitive landtypes are located in the project file.

On sensitive landtypes special project design criteria or restoration activities are usually needed to avoid resource impacts. Results from WATSED modeling, and the amount of activity and reduction of risks on sensitive landtypes are used as indicators of the potential for production and delivery of sediment.

Figure 3-31. Mission Brush Watershed Effects Analysis Boundaries



3.7-B. Rain-on-Snow Events and Watershed Responses

Changes in forest vegetation resulting from management or natural events can affect the frequency and magnitude of rain-on-snow events (Harr 1986). The rain-on-snow zone falls between 3,000 and 4,500 feet in elevation, where the snow pack generally accumulates all season long but is constantly near isothermal (*isothermal* describes conditions when the entire snow pack reaches the temperature of 32 degrees Fahrenheit). When warm air masses associated with moisture raise the freezing level to 4,500 feet or higher, rain falling below the freezing level can result in rapid melting of the snow pack and flash flooding.

The impacts to stream channels in the event of a flash flood are predominately caused by road-stream crossing failures (USDA Forest Service 1996). When debris flows plug culverts and concentrate water over the tops of road fills or divert water down the road or ditch and onto hill slopes unaccustomed to concentrated overland flows, failure may occur. Evidence of this type of failure has been observed in the Hall Mountain Area. These failures produce large concentrations of sediment and are usually the primary source of total sediment inputs to stream channels (USDA Forest Service 1998).

WATSED does not evaluate increases in sediment and peak flows specifically resulting from "rain-on-snow" events or other stochastic events, since it was not intended nor designed to model event-based processes and functions. Therefore, the potential for rain-on-snow events can be evaluated by determining the amount of the watershed within the rain-on-snow zone. The Mission Creek Watershed has 6560 acres in the rain of snow band, which is 21% of the entire watershed. While 56% of Brush Lake Area is within the rain-on-snow zone, only approximately 25% of the Brush Lake area is above 4500 feet in elevation. Twenty seven percent of the Hall Mountain Area is within the rain-on-snow zone.

Fish Presence and Biological Requirements

3.7-C. Data for Wildlife and Fisheries Analysis

C-1) Supplemental Analysis

The 9th Circuit Court ruled that westslope cutthroat trout habitat data that was used in the Iron Honey project on the Coeur d'Alene River Ranger District was too outdated to carry the weight assigned to it, thereby preventing the Forest Service from making an accurate assessment of cumulative impacts on habitat and population of the westslope cutthroat trout. Direction from the Ninth Circuit Court, *(Lands Council v. Powell,* 385 F.3d 1019, 2005 Amended Opinion)..

C-2) Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

Time is not the biggest factor in determining whether habitat data is stale; disturbance is. For example, if a habitat survey was completed in a stable B channel 15 years ago and no disturbance of consequence has affected the stream, the data would not be stale or inaccurate. However, if a flood, debris torrent, stand-replacing fire, or some other disturbance has occurred (including chronic disturbances), the data needs to be re-evaluated.

The fisheries habitat conditions and results of fisheries surveys are documented in sections 3.5-H and 3.5-I. In summary, westslope cutthroat trout are known to inhabit Mission Creek and have been stocked into Brush Lake over the last decade. Currently, bull trout are not known to inhabit Mission and Brush Creeks. Torrent sculpin inhabit large streams, and most white sturgeon are found only in the Kootenai River, but a few have been located in larger tributary streams. Burbot prefer lakes or large rivers.

The cumulative effects to fisheries are described in Chapter 4. The analysis of cumulative effects included the realignment of U.S. Highway 95 and past, present and future timber sales on both National Forest System lands and private lands. There have been no catastrophic events in the cumulative effects area that would have resulted in any change to the fisheries community. There would not likely be any discrepancies from the 1997 presence/absence surveys.

Hook and line sampling in 2003 yielded a high concentration of westslope cutthroat trout in Mission Creek (personal communication, Doug Nishek). Westslope cutthroat trout have been stocked into Brush Lake in the years 2002-2005 by Idaho Department of Fish and Game; therefore many individuals have likely migrated downstream into Brush Creek.

The FEIS discusses mass failures that occurred in the Hall Mountain area during the winter of 1997. However, because this area does not provide habitat for the species listed above because the streams are ephemeral and go subsurface at the bottom of the hill, the event would not have changed the cumulative effects to fisheries.

The realignment of U.S. Highway 95 was included in the WATSED analysis and discussion of WATSED results. By use of timing restrictions, onsite direction and Best Management Practices, sediment delivery to occupied fish habitat would be minimized.

Cumulative effects to fisheries are shown to be consistent with the Forest Plan, Endangered Species Act, National Forests Management Act, Clean Water Act, Idaho Forest Practices Act, Executive Order 12962 regarding aquatic systems and recreational fisheries, and the State of Idaho Governor's Bull Trout Plan.

C-3) Changes between the 2004 FEIS/ROD and the Supplemental FEIS

The alternatives included in the Mission Brush FEIS contain features and design criteria (Chapter 2, section 2.8) that would be used to avoid, or to the fullest extent possible, minimize the potential for adverse impacts to the resources, including wildlife and fisheries. These items did not change.

Past fisheries surveys, Idaho Department of Fish and Game (IDFG) stocking records, and records of interviews with IDFG personnel were reviewed for timeliness and relevance to current conditions. This review of the district's fisheries data did not change either the existing condition or determination of effects as stated.

3.7-D. Fry Emergence

D-1) Supplemental analysis

The 9th Circuit Court held that because the Inland Native Fish Strategy (INFS) standards and the Forest Plan fry emergence standard measure different variables, are triggered by different conditions, and have different remedies, applying both to any conceivable project presents no conflict. (Lands Council v. Powell 395 F.3d 1019 (2005 amended opinion).

D-2) Relationship of the Supplemental Analysis to the 2004 FEIS Analysis

After release of the 2004 FEIS/ROD and the 2005 Supplemental FEIS, the Idaho Panhandle National Forests amended the Forest Plan to remove objectives, standards, and monitoring requirements pertaining to fish fry emergence.

On June 2, 2005, the Forest Supervisor signed a Decision Notice and Finding of No Significant Impact that amended the Forest Plan (IPNF 2005. Fry Emergence Amendment Decision, 70 pages.) The amendment modifies or removes objectives, standards, and monitoring requirements pertaining to fry emergence success

The amendment was implemented for the following reasons:

- Fry emergence objectives, standards and monitoring requirements in the Forest Plan did not contribute as well as INFISH objectives, standards, guidelines, and monitoring direction towards meeting the goals of providing sufficient habitat in support of maintaining diverse and viable populations of fish species across the forest.
- In addition, because of the limited application of the fry emergence models and their unreliability, and the inability to determine fry emergence success in the field due to high variability affected by multiple natural and human-caused factors, the Forest Service was not able to state with any degree of certainty whether measures of fry emergence success were accurate or precise.

3.7-E. Fisheries Cumulative Effects Area

The cumulative effects areas contains approximately 20 miles of fish-bearing streams, all of which are in the Kootenai River Basin. Fish species that inhabit streams in the Kootenai River Basin include native populations of westslope cutthroat (*Oncorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), interior redband rainbow trout (*O. mykiss* subsp.), whitefish (*Prosopium* spp.), white sturgeon (*Acipenser transmontanus*), burbot (*Lota lota*), kokanee (*O. nerki*), northern pike minnow (formerly squawfish; *Ptychocheilus oregonensis*), large-scale sucker (*Catostomus macrocheilus*), sculpin (*Cottus spp*.; primarily slimy sculpin, *C. cognatus*, and torrent sculpin, *C. rhotheus*), longnose dace (*Rhinichthys cataractae*) and redside shiner (*Richardsonius balteatus*) (Simpson and Wallace 1982; district files).

Introduced fish species include populations of rainbow trout (*O. mykiss*) and eastern brook trout (*S. fontinalis*). The creation of hybrid fish between native cutthroat trout and exotic rainbow trout and between native bull trout and exotic brook trout may be present.

Streams within the project area flow into the Kootenai River. Given the scope and ensuing analysis of this project, it was determined that cumulative effects would not be detected in the Kootenai River.

Due to the large number of fish species within the cumulative effects areas, analysis of direct, indirect, and cumulative effects to fish will use the concept of management indicator species (MIS). Under this concept, larger groups of organisms or communities are believed to be adequately represented by a subset of the group (Idaho Panhandle National Forest Plan 1987). The Forest Plan of the Idaho Panhandle National Forests (IPNF) identifies cutthroat trout and bull trout as potential MIS for fisheries conditions. Westslope cutthroat trout and bull trout are native to some streams in the project area (Simpson and Wallace 1982; district files). Currently, west slope cutthroat trout are known to utilize streams within the project area for spawning, rearing, and over-wintering. Although bull trout may have been historically present across the project area, they currently occur within the main stem Kootenai River. Nonetheless, west slope cutthroat trout and bull trout have been selected as appropriate MIS for the fisheries analysis of this project. Although both of these fish do not exist in all streams, in general one of the two is found in all large streams. In addition, westslope cutthroat trout and bull trout are likely sensitive indicators for all the cold-water biota within the stream segments (Meehan 1991).

The life history of the torrent sculpin, Kootenai River white sturgeon, and burbot will be included below because they are either listed as threatened or endangered under the Endangered Species Act of 1973 (ESA), or sensitive by the Regional Forester. Also, the torrent sculpin and interior redband trout are also cold water species, the effects of this action to these species will be similar, where these species occur in the project area, and will be covered under the effects to the MIS. The torrent sculpin and interior redband trout have been documented within the Kootenai River Basin but not in the fish-bearing streams within the cumulative effects areas. White sturgeon and burbot are found only in the main stem of the Kootenai River and possibly large tributaries (e.g., Yaak River in Montana).

E-1) Westslope Cutthroat Trout

Westslope cutthroat trout are listed as "sensitive" by Region 1 of the USDA Forest Service and are listed as "species of special concern" by the State of Idaho. In addition, the U.S. Fish and Wildlife Service (USFWS) lists westslope cutthroat trout as a "Species of Concern" with respect to section 7(c) of the 1973 Endangered Species Act (ESA) (10/28/99 letter, FWS 1-9-99-SP-483) and is under review for listing under the ESA.

Their preferred habitat is cold, clear streams with rocky, silt-free riffles for spawning and slow, deep pools for feeding, resting, and over-wintering (Reel 1989). Pools are a particularly important habitat component as cutthroat trout occupy pool habitat more than 70% of the time (Mesa 1991). Other key features of westslope cutthroat habitat are large woody debris (LWD) for persistent cover and habitat diversity as well as small headwater streams for spawning and early life-stage rearing.

Resident populations of westslope cutthroat trout are currently present in watersheds within the project area. Resident populations remain in river tributaries throughout their life. Certain life histories (i.e. fluvial and adfluvial fish) use river tributaries for early rearing and spring spawning as adults, but typically out-migrate to river (fluvial) or lake (adfluvial) habitat as they mature. In the fall, fish that have not previously returned to river and lake areas migrate to deeper water where they congregate and over-winter (Bjornn 1975). Streams within the project area may have historically been utilized by westslope cutthroat trout representing all life history strategies during various phases of their life cycle; however, currently mostly resident fish exist.

A population status review of westslope cutthroat trout in Idaho has determined that populations in northern Idaho have declined; however, they currently occupy over 18,000 stream miles (95% of historical distribution) in Idaho (Shepard et.al. 2002). New information, responses of some populations to protective measures, and assessments made during drought conditions without the benefit of long term trend data may all have contributed to discrepancies between the 2002 population review by Shepard et.al., and that of Reiman and Apperson (1989), who estimated that populations in northern Idaho have declined over their historic distribution with viable populations existing in only 36% of the original Idaho range (Shepard, et.al., 2002).

Westslope cutthroat trout have been seriously affected by the presence of introduced brook trout. Brook trout out-compete westslope cutthroat trout in areas where habitat is degraded. Westslope cutthroat trout are known to inhabit Mission Creek. Westslope cutthroat trout were stocked into Brush Lake over the last decade. In addition, IDF&G stocking records show stockings of eastern brook trout, rainbow trout, and kokanee during the 1980s and 1990s in Brush Lake. Westslope cutthroat trout may be out-competed if habitat is degraded. Consequently, within the cumulative effects areas, Mission Creek is likely the most

important to species persistence for westslope cutthroat trout. The connectivity between stream habitat and Kootenai River habitat is extremely important to westslope cutthroat trout habitat exhibiting a fluvial life history.

E-2) Bull Trout

Bull trout are listed as a "threatened" species under the ESA (Federal Register, Volume 63, No. 111, June 10, 1998). Currently bull trout are not known to inhabit Mission or Brush Creeks. Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics including: water temperature, stream size, substrate composition, cover and hydraulic complexity have been associated with distribution and abundance (Dambacher and others, in press; Jakober 1995; Rieman and McIntyre 1993).

Stream temperature (below 15 degrees Celsius; Goetz 1989) and substrate composition are important characteristics of suitable bull trout habitats. Bull trout have repeatedly been associated with the coldest stream reaches within basins. The lower limits of many strong bull trout distributions mapped by Lee et al. (1997) correspond to a mean annual air temperature of about 4 degrees Centigrade (ranging from 3 to 6 degrees Centigrade) and should equate to ground water temperatures of about 5 to 10 degrees Centigrade (Meisner 1990). Water temperature can be strongly influenced by land management (*Henjum et al. 1994).

Stream channel equilibrium (stability) is the balance between sediment yield, water yield, and channel morphology, which exists within a stream system. Studies indicate that shifts away from channel equilibrium can result in negative changes in the structure and function of stream ecosystems (Bilby and Likens 1980, Schlosser 1982) and their dependent fish populations. Bisson and Sedell (1982) reported that where stream channels became destabilized, riffles elongated and in many cases extended through former pool locations resulting in loss of pool volume. They suggested that declines in older fish may be the result of their dependency upon deeper water habitats. The persistence of bull trout over time can best be provided by maintaining lateral and instream habitat complexity in association with channel stability (Karr and Freemark 1983, Karr and Dudley 1981, Gorman and Karr 1978).

In a status review of bull trout on the Idaho Panhandle National Forests, stocks from the Kootenai River watershed were considered to be at moderate risk of extinction (Cross 1992). Genetic analysis has shown that bull trout within many sub-basins of northern Idaho may be unique stocks (B. Rieman, Forest Service Research, personal communication), but they are closely linked to the upper Columbia River clade - one of three major groupings of bull trout throughout the Columbia and Klamath River drainages (Williams, unpublished).

E-3) Torrent Sculpin

Torrent Sculpin were added to the Idaho Panhandles' sensitive species list March 12, 1999. This species is known to inhabit the Kootenai River Basin, but data on distribution by streams is limited (Simpson and Wallace 1982; Scott and Crossman 1973). They prefer riffle habitat in medium to wide streams and rivers (Markle et al. 1996). However, large adults (>150 mm) are found in pools. Spawning usually occurs in May and June and occurs in riffles with moderate to swift flows. Similar to westslope cutthroat and bull trout, the torrent sculpin is also a cold-water species and consequently its range overlaps with both these species. Because this species primarily inhabits large streams, it would only be affected by this project if the magnitude of the effects altered habitat conditions in the larger basins. Because this is a cold water species, possible effects on this species will be covered by analyzing effects on the cold water MIS (Management Indicator Species).

E-4) White Sturgeon

The Kootenai River population of white sturgeon is listed as endangered under ESA (Federal Register, Volume 59, No. 171, September 6, 1994). White sturgeon are anadromous in most of the larger rivers in which they occur but are landlocked in the middle and upper Columbia River system. The Kootenai River population range includes lake and river habitats between the outflow of Kootenay Lake and Kootenai Falls upstream in Montana. Most fish have been found only in the Kootenai River, but a few have been located in larger tributary streams (Graham 1981). In 1989, a State of Montana enforcement officer cited an angler for taking of a sturgeon in the Yaak River (USDA 1993). However, few have been sighted in other tributary streams.

Spawning takes place in May or June, occurring over rock or bedrock substrate in swift currents near rapids when water temperatures are between 8.9 and 16.7 degrees Celsius (Graham 1981). It is believed that most spawning in the Kootenai River occurs in the canyon section between Bonners Ferry and Kootenai Falls.

The Kootenai River population has declined and reproduction has been limited since the installation of Libby Dam (Partridge 1983). The current population appears to be composed of mid-size and larger fish, with few juveniles. The May-July regulated flows (1975-80) are now one-fifth or less of the natural discharge patterns (1910-1965; USDA 1993). Daily mean temperatures

have dropped approximately five degrees Celsius during the sturgeon spawning period due to selective withdrawal (USDA 1993). These changes have, in effect, converted the river to a third order headwater stream with an aberrant discharge pattern to which few organisms are adapted (USDA 1993).

The Kootenai River population of the white sturgeon is restricted to approximately 270 kilometers of the Kootenai River and do not inhabit any of the streams in the cumulative effects analysis area.

E-5) Burbot

Burbot are listed as sensitive by the Regional Forester and are considered a species of concern by the State of Idaho and the U. S. Fish and Wildlife Service (FWS 1-9-99-SP-483, October 28, 1999). They prefer lakes or large rivers and in Idaho are found only in the Kootenai River system (Simpson and Wallace 1982). Spawning takes place in the winter and may occur in shallower waters of rivers and in small tributary streams, as well as in rivers in deep water under the ice (Simpson and Wallace 1982; Scott and Crossman 1973). Numbers of burbot have declined since 1965 in the Kootenai system.

3.7-F. Aquatics Habitat Condition and Connectivity

Environmental conditions in the cumulative effects area have been influenced by natural events and processes (e.g., historic fires) as well as human activities (e.g., logging and road building). Effects of natural disturbances have interacted with other land-evolving processes to form the basic character of watersheds and the dependent stream resources. Due to variability in location, frequency, intensity, and ultimately, the effects of natural processes on the physical environment, dynamic landscapes with diverse conditions are formed at various spatial scales. Biological communities including native fish populations led to development of functional ecosystems that are inherently resilient to effects from natural disturbance regimes representing pulse-type disturbance (Reeves et al. 1995). Pulse disturbances influence the natural range of environmental conditions that are expected for ecosystems functioning at broad geographic scales but typically allow systems to begin recovering to pre-disturbance conditions soon after the disturbance.

Natural disturbance regimes (e.g. flood, wildfire, etc) and their associated properties (e.g. sedimentation rates and other influences on aquatic habitat) have been altered in the cumulative effects area by human activity. Land use activities that have modified natural disturbance characteristics include roads, refuge and associated diking, stream modifications (constriction, channelization, diversions, culverts, and cleaning/removal of woody debris), logging and fire suppression. Many of these human influences are considered press-type disturbances that continue to affect the condition and trend of fisheries resources long after the initial disturbance. Press disturbance differs from pulse disturbance in several aspects, but generally press disturbance is persistent in ecosystems and impairs the ability for ecosystems to recover to pre-disturbance conditions (Reeves et al. 1995). Within the cumulative effects area, the recovery process from pulse disturbance has been hindered by the presence of various press disturbances. The following discussion relates these findings to the existing condition of fish habitat.

The cumulative effects area in this project has primarily been affected by historic fires (natural disturbance) and/or logging, road construction and floodplain alteration (human activity). The
disturbance history has played a large role in determining habitat conditions in fish-bearing streams. Within the analysis area, only streams that were historic bull trout habitat and known or presumed to be fish bearing, will be discussed in detail.
Watershed Reference Conditions

F-1) Watershed Reference Conditions

The watershed conditions are described for each of the major areas identified for this project – Mission Creek Watershed, Hall Mountain Area, and Brush Lake Area (Figure 3-31.). Some conditions are of concern only for particular areas, and thus might not be described in detail for all three areas. For example, the potential for mass failures applies more to Hall Mountain than Mission Creek or Brush Lake.

a) Stream Channel Characteristics

Stream channel characteristics are directly influenced by geomorphology, soils, past harvesting, road building and other management activities that occur within a watershed. Historic activities, primarily in Mission Creek, have changed channel characteristics and flow regimes, which have created the current stream channel conditions present today.

Mission Creek Watershed Stream Channel Characteristics

Timber harvesting and road building began in the Mission Creek drainage since the early 1900's. Log flumes were constructed along the West Fork of Mission Creek to transport logs downstream from a Canadian mill. Riparian logging and the construction of access roads for flume maintenance and log removal were constructed near stream channels (Tom Sandberg, cultural resource inventories). Additional riparian logging occurred in the East Fork drainage and in Mission Creek below the confluence with the East Fork.

Riparian logging and flume construction created numerous woody debris jams, which resulted in channel alterations, sedimentation, and long-term loss of riparian forest cover. These debris jams have caused frequent channel diversions, plus have stored substantial volumes of sediment. Currently, the debris jams are rapidly decaying, making them more susceptible to structural failure. If these debris jams fail, the stored sediment and bed load would be released (project file).

Mission Creek is a braided or multiple channel system between the confluences of the East Fork to Round Prairie Creek. Both natural processes and management activities have created this condition. High water and sediment yields associated with the melting and retreat of the glaciers during the last ice age created a landform that is very susceptible to erosion during flood events. The landform is an alluvial fan that is composed of unconsolidated glacial till with an ash cap soil.

When riparian logging occurred on this landform, stream bank erosion increased as well as the number of woody debris jams. When stream channels are blocked by woody debris, water is diverted and new channels are formed. While channel migration occurs naturally in glacial till and on alluvial fans, the past riparian logging has increased channel migration by destabilizing banks and providing excessive woody debris. This has created substantial amounts of fine sediment and bed load material.

Road encroachment is another concern within the Mission Creek watershed. FDR-272 is currently encroaching on Mission Creek for approximately 5 miles, which has restricted Mission Creek's access to its floodplain. FDR 272-A and 272-B and the associated spur roads, built in the mid-1900's and reconstructed during timber harvest activities in the 1980's, are also posing sediment risks to the East Fork and have historically affected stream channel characteristics.

The Zion Creek drainage has received the least active management compared to Mission Creek and its tributaries. Some historic riparian logging occurred with associated road building during the 1950's. Approximately 150 acres of harvest activities also occurred in the 1980s.

Brush Creek Stream Channel Characteristics

An old earthen and rock dam was constructed on the south end of Brush Lake during the 1920s, raising the level of water in the lake by approximately four feet. A breach in the earthen dam occurred sometime during the 1950's or 1960's and the dam was subsequently reconstructed using rocks. Brush Creek flows are partially controlled by this dam.

3.7-G. Watershed and Erosional Processes

G-1) Hall Mountain Area Erosional Processes

Mass Failures

The west face of Hall Mountain has been historically logged and mined both on National Forest System Lands and on private lands. Numerous skid trails and prospecting roads were constructed across this face. Along the southwestern end of the area, there are patches of highly dissected, unstable landtypes. Several landslides exist on these slopes especially below roads. Old slumps and failures are also present in several of the draws with intermittent channels. Some of these failures occurred during the winter of 1997 during a rain on snow event. Snowmelt runoff from roads and old skid trails saturated the hill slopes and concentrated in small intermittent draws resulting in landslides and gully formation.

G-2) Mission Creek Watershed Erosional Processes

Water Yield and Peak Flows

Fluctuations in water and sediment yields over time can provide a good basis for the reference condition, the historic range of variation, and current trends. To understand responses and recovery rates from past activities within the Mission Creek Watershed, average annual water yields and sediment yields were calculated using WATSED. The time period modeled was

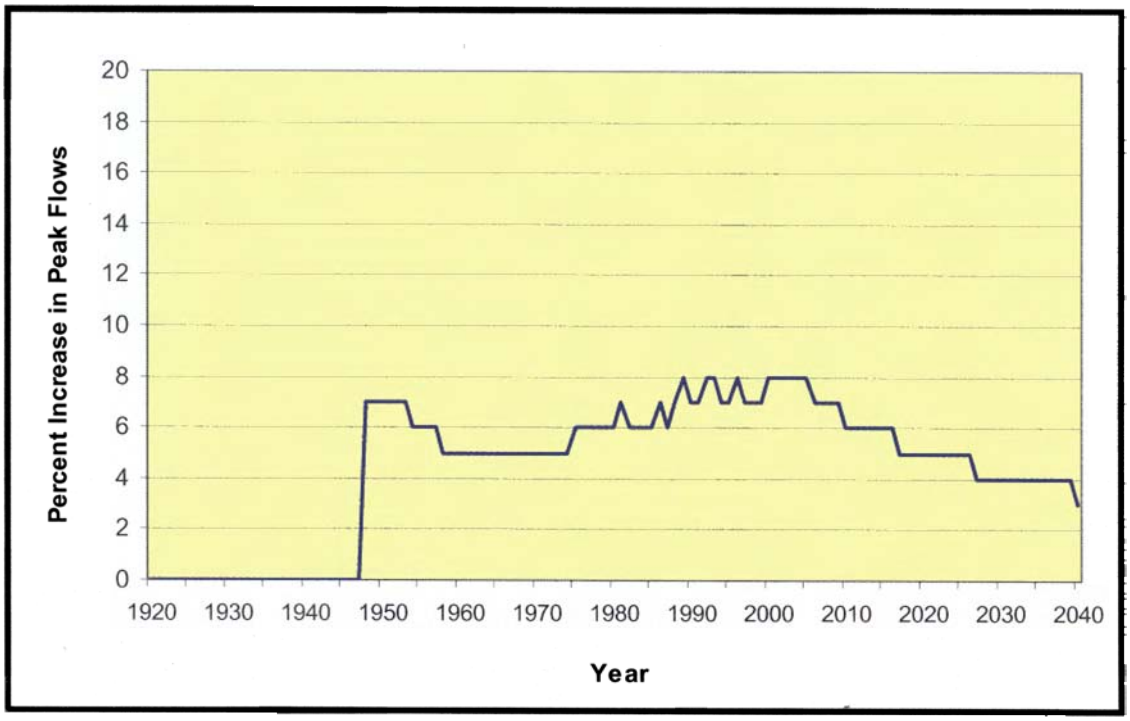
from 1920 to 2040. Activities, such as those discussed in Reference Conditions (i.e. riparian logging) that occurred prior to 1930 could not be included in the WATSED modeling due to lack of site-specific data. Understanding historical patterns and processes helps evaluate consequences and provides a basis for predicting the effects of natural and human disturbances (Reiman et al, draft manuscript).

Changes in duration and intensity of peak flows are often used to measure changes in water yield from vegetative conditions. McCaughey et al (1997), King (1993), and Megahan (1983) have found that large stand-consuming fires, forest insects and diseases, and regeneration harvest can alter snowmelt patterns and water yields due to vegetation changes on the slopes. The timing and duration of summer or base flows can also be altered through vegetation changes. Keppeler (1998) found that when at a minimum of 50 percent of the drainage basin had been harvested, summer flows were altered during the long dry summer season.

The following chart displays the estimated peak flow increases from past fires, road construction and harvest activities from 1920 projected through 2040. Prior to 1920, vegetation changes from wildfires established reference points in the natural ranges of peak flows under which Mission Creek and its tributaries have evolved. During the 1890s, a 16,000-acre stand replacing fire burned over most of the Mission Creek watershed (vegetation section). When compared to previous studies, water yield increases due to historic fires would be expected to range between 7 and 18% depending on the level of disturbance. For example, water yield responses to natural fires in the West Gold watershed (tributary to Lake Pend Oreille) analysis ranged from 7 percent increase in 1934 due to a 1000-acre fire, to 17 and 18% increase due to fires in the 1850's and 1890's (USDA Forest Service 2002). This pattern mimics other studies within the region (McCaughey et al. 1997).

For the Mission Brush project, it would be expected that the same pattern of snowmelt and water yield response to changes in vegetation would occur in the Mission Creek drainage.

Figure 3-32. Historic and existing condition of percent increase in peak flows within the Mission Creek Watershed, projected until 2040



The largest modeled peak flow spike occurred in 1948 and is attributed to over 3500 acres of vegetation treatments that occurred in the West Fork of Mission Creek in Canada. This treatment resulted in an increase in peak flows of 7%. Ninety two percent of the West Fork drainage and 18% of the entire Mission Creek watershed were treated.

From 1974 through the 1990, there was a general increasing trend in peak flows to 8% from treatment activities. From the early 1990s through 2003 water yields have maintained between 7 and 8%.

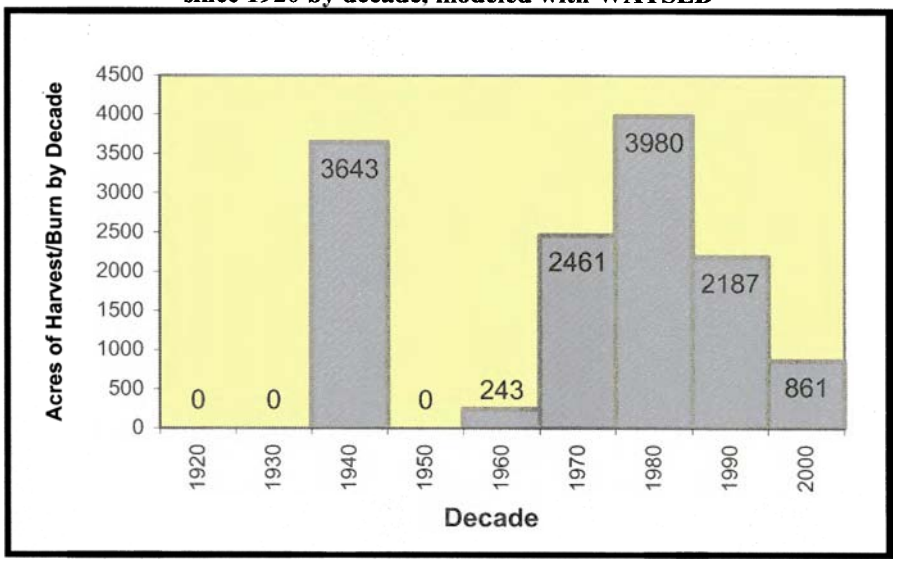
Research in the geographic region has shown that causes of peak flows may also be associated with less frequent mid-winter rain-on-snow events and rain-on-spring-snow events (MacDonald and Hoffman 1995). From their research, spikes are usually higher and over a shorter duration than what are currently modeled in Figure 3-32. WATSED cannot predict peak flows from these stochastic events because the frequencies of these events do not occur on an annual basis and are dependent on certain climatic conditions such as air temperature, intensity and duration of precipitation, rain-on-snow elevations and snowpack characteristics (Berris and Harr 1987). Due to the lower percentages of rain-on-snow acreage within this project area, these events are less likely to occur.

Sediment Yield

The dominant sediment sources in Mission Creek watershed were timber harvesting and the associated action of constructing roads. The next two figures, when considered together, show a strong relationship between harvest activities and road building and fluctuations in sediment yields.

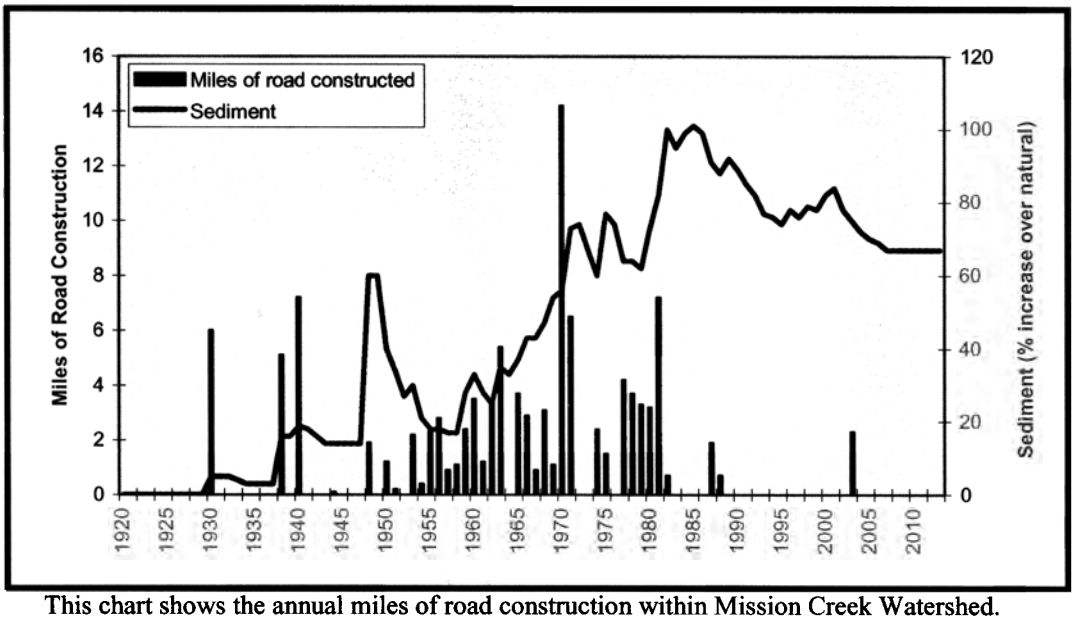
The following chart displays the historical harvested and burned acres within the Mission Creek watershed by decade. Harvest activities peak in the 1980s, but were consistent in the 1970's and 1990's. The acres treated in 1940's were mostly attributed to activity in Canada.

Figure 3-33. Estimated acres harvested or burned in the project area since 1920 by decade, modeled with WATSED



Annual miles of road construction associated with past activities in the watershed are displayed in the following chart. Road construction activities started in 1930 and continued through 1985. During that time period 41.9 miles of road were constructed in the drainage. From 1985 to present a significant decrease in the miles of roads constructed occurred with an expected decreasing trend in sediment yields.

Figure 3-34. Effects of road building and sediment yield



This chart shows the annual miles of road construction within Mission Creek Watershed. (The historic and existing condition of sediment yield trend within the Mission Creek Watershed as shown on this graph is associated with both timber harvest and road building. These two activities usually occur simultaneously).

From 1930 to 1969, 59.1 miles of road were constructed in the Mission Creek watershed with an overall increase in sediment yields of 49%. From 1970 to 2002, 51.8 miles of road were constructed for an increase in sediment yields of only 22%, which is less than half the increase seen between 1930 and 1969 even with approximately the same miles of roads constructed.

Roads constructed before the adoption of the Idaho Forest Practices Act in 1970 did not require Best Management Practices (BMPs) (Megahan et al 1992). Roads built after 1970 were built under the guidance of BMPs and presumably produced less sediment. This helps explain the differences in sediment yield increases between the two time periods.

3.7-H. Fisheries Reference Conditions

The reference condition for fish habitat is based on reference reaches in Mission Creek (see Watershed Reference Conditions), historic information, knowledge of basic ecological processes, and professional judgment.

Physical attributes of fish habitat are mainly defined by stream channel condition. Channelization of the lowest portions of Mission and Brush Creeks has extensively altered flow regime, sinuosity, pool frequency and complexity, and large woody debris frequency. As a result, habitat degradation in this reach is extensive, likely resulting in a thermal barrier to bull trout migration from the Kootenai River.
The historic distribution of bull trout in the Mission Creek Watershed is unknown. Their current distribution is limited to the Kootenai River; they cannot access habitat in upper Mission Creek. It is not likely that more habitat was historically available to bull trout, due to the waterfalls in Section 4.

The historic distribution of westslope cutthroat trout (WCT) in the Mission Creek watershed is unknown, although Idaho Department of Fish and Game (IDFG) stocking records show stockings of WCT in Brush Lake in 1989, 1990, 1991, 1996, 1997, and 2002. Electrofishing surveys above the falls on Mission Creek in 1996 captured WCT, although the introduction of eastern brook trout has likely depressed the WCT population.

H-1) Watershed Existing Conditions

Beneficial Uses

The Idaho Department of Environmental Quality (IDEQ) designates beneficial uses to be protected for each water body in the state. Mission Creek (from the Canadian border to the confluence with Brush Creek) and its tributaries are currently designated as Cold Water Communities (COLD), Salmonid Spawning (SS) and Primary Contact Recreation (PCR) under the Idaho Administrative Procedure Act. Brush Creek, from source to mouth, is designated as COLD, SS and Secondary Contact Recreation (SCR).

Mission, Hall, Zion and Brush Creeks are currently not meeting temperature standards for cold-water communities and are on the IDEQ's current 303d listing of stream segments of concern for temperature (PF STRM-05 IDEQ news release 1/17/06, and associated information,). However, as stated earlier, the requirements of the INFS amendment to the 1987 IPNF Forest Plan (Appendix B) as well as other specific design features of this project (Chapter 2, section 2.8 Watershed and Fisheries Features) would avoid or mitigate any activity that could potentially increase stream temperatures.

Stream Channel Characteristics

Changes in the magnitude, intensity, or duration of peak flows and sediment yields have the potential to change stream channel characteristics. Stream channels within the project area are primarily alluvial systems (sediment deposited and formed) and are the most susceptible to stream bank erosion, changes in sediment supplies, and large woody debris removal (Chamberlin et al 1991, Rosgen 1996). Stream channels where the substrate is composed of bedrock and boulders that have a good portion of large woody debris jams and are more confined within the valley bottom, are more stable with respect to fluctuations in flow and sediment yields (Chamberlin et al 1991, Rosgen 1996).

Mission Creek – Existing Condition

Within the Mission Creek Watershed, the dominant channel forming and sediment transport events are associated with spring runoff and flood events. The flood event during the spring of 1996 caused channel migration and aggradation, and degradation of existing channels. Stream survey data from the summer of 1996 on Mission Creek characterizes the

channel as predominantly high gradient (>4%) and moderately confined with the dominant substrate being small boulders and cobbles. Large woody debris is prevalent throughout the Mission Creek drainage.

Approximately 5 miles of FDR-272 is encroaching on Mission Creek, and has limited access to the floodplain. FDR-272 is poorly drained and is capturing flow from the hillslopes above. In some areas, the cut-slope has failed in the past and remains unstable. The road is paved from Highway 95 to the intersection of FDR-2481. The lower portion of the road has degraded due to frost heave and needs an improved surface and improved subsurface drainage. Above the intersection with FDR-2481, 272 is graveled. This portion of the road up to the East Fork Bridge is contributing sediment to Mission Creek. In some areas, the channel abuts the road fill.

East Fork Mission Creek has experienced a high level of riparian harvest historically and shows evidence of stream bank erosion. The 1996 stream surveys characterize the channel as predominantly moderate gradient (3%) and moderately confined with small boulders and cobble being the dominant substrate on the reaches located within the United States. In 1989, log structures were placed in upper reach of the East Fork, in a 1970s clearcut just below the Canadian Border (project file) to improve fish habitat and restore channel morphology. Monitoring of the structures in 1996 found that the structures were providing excellent fish habitat and were maintaining proper channel dimensions (project file).

Several roads located within the East Fork drainage are at risk to failure. Forest System Road 272-A in the East Fork drainage crosses a small draw before the Canadian border. The fill at the road drainage crossing is often saturated and is at risk to failure. Past failures within this area are present. The sediment from a failure on this road would reach the East Fork of Mission Creek. Additional roads, mostly 272-B and associated spurs, along the west-facing slope of the East Fork drainage are also unstable and pose a risk of contributing sediment to the East Fork channel. Road associated failures in this area would impact channel recovery from past projects.

West Fork Mission Creek has a lower gradient than East Fork and has experienced fewer disturbances. The 1996 stream surveys characterize the channel as predominantly low gradient (<2%) with an accessible floodplain and gravels being the dominant substrate.

Zion Creek is a headwater tributary to Mission Creek. This watershed has had little activity compared to the East and West Forks of Mission. Zion Creek has recovered from early old growth riparian logging and is functioning properly.

Brush Creek – Existing Condition

Brush Creek is a perennial stream; however, it does flow intermittently. The dam on Brush Lake and two water diversions downstream affects Brush Creek flows. The lowest reach has been channelized from the point it flows onto the Kootenai Valley until its confluence with Mission Creek. The channel from Brush Lake to the channelized reach is mostly high gradient (>4%) and highly confined with the predominant substrate being gravels and cobbles and short bedrock sections (USDA Forest Service, Rock Bottom EA 1996). Currently there are approximately 3.5 miles of old roads encroaching on wetlands north of Brush Lake.

H-2) Watershed and Erosional Processes

Hall Mountain Area – Watershed and Erosional Processes

Mass Failure

There are approximately 173 acres of high mass failure potential landtypes in the Hall Mountain Area (USDA Forest Service, North Zone Geographic Assessment, draft in progress).

The LISA model was used to assess slope stability under existing conditions on the west-facing slope of Hall Mountain. The outputs estimated that the probability of failure was very low for slopes up to 70% under current vegetation densities, with low soil moisture and with soil moistures that would occur during an average precipitation event.

Below FDR-2217-C, there are several shallow landslides that have occurred during a rain-on-snow event in 1997. Old skid roads on private and public lands above 2217-C intercepted and concentrated runoff into the 2217-C ditchline. Excess flow off the 2217- C-spur was a causal factor of these slides.

Mission Creek – Watershed and Erosional Processes

Water Yield and Peak Flows

The Mission Creek watershed is a snowmelt-dominated system; where peak flows are generated during the spring melt periods. Mean monthly peak flows within Mission Creek watershed are estimated at 92.2 cubic feet second (cfs) and the current background water yield value is estimated at 8 percent over natural (project file). Figure 3-32 displays the current water yield percentage and its projected trend over the next five years.

Sediment Yield Fisheries

The WATSED model estimates that the natural background sediment yield rate within the Mission Creek watershed is 391 tons/year (project file). Sediment yields increased significantly from the late 1950s to the mid-1990s, peaking at approximately 101% over natural conditions. This is based on past natural events, plus road construction and harvest activities within the drainage. However, sediment yields have generally been decreasing since 1985 to approximately 75% over natural conditions as displayed in Figure 3-34. Recovery from past activities continues until 2008, when sediment yield maintains at approximately 67% over natural conditions through 2030.

3.7-I. Fisheries

I-1) Fish Population Existing Conditions

Mission Creek
In 1994, electrofishing surveys in T65N R1E S21 above the falls found westslope cutthroat trout densities to be 9.1 fish per 100 m² and eastern brook trout densities to be 32.6 fish per 100 m² (district files). Bull trout are not known to utilize the accessible portion of Mission Creek. In 1996, electrofishing surveys in Section 8, T.65N., R.1E., B.M., below the falls identified westslope cutthroat trout and eastern brook trout. Other salmonids known to inhabit the Mission Creek drainage include rainbow trout and kokanee salmon.

Brush Creek and Brush Lake Area
Idaho Department of Fish and Game (IDFG) has stocked Brush Lake extensively over the past two decades. Species stocked include eastern brook trout, various strains of rainbow trout, kokanee salmon, and westslope cutthroat trout.

I-2) Fisheries Habitat

Mission Creek
Mission Creek is the only major stream to enter the Kootenai River from the east side of the valley. The lower 3 km have been diverted and diked and have a substrate consisting of sand, silt, and clay, which may be considered a thermal barrier to fluvial life forms. After leaving the valley floor, the stream substrate becomes mostly rubble and large gravel, providing 1.2 km of fair to good spawning habitat below a waterfall barrier (Partridge, 1983).

Brush Creek
Brush Creek is a perennial stream; however, it is not uncommon that it flows intermittently. The lowest reach has been channelized. The channel from Brush Lake to the channelized reach is mostly high gradient (greater than 4%) and highly confined with the predominant substrate being gravels and cobbles (Rosgen B3/B4) and short bedrock sections (Rosgen A1/B1).

I-3) Threatened and Endangered Species

White Sturgeon
White sturgeon are not found outside of the mainstem Kootenai River, which is outside of the cumulative effects area for this project.

Bull Trout
No Bull trout have been found in streams within the cumulative effects area of this project, including Mission, Zion, or Brush Creeks. The habitat is connected to the Kootenai River; however, the lower 3 km of Mission Creek has been channelized, likely resulting in a thermal barrier to fluvial bull trout migration from the Kootenai River.

I-4) Governor's Bull Trout Conservation Plan

The mission of the Governor's Bull Trout Plan is to "…maintain and or restore complex interacting groups of bull trout populations throughout their native range in Idaho" (State of Idaho 1996). Details about this Plan can be found in Appendix B. Through a process involving state and federal agencies, interested groups and individuals (i.e., Basin Advisory Groups, Watershed Advisory Groups, Technical Advisory Teams), a Problem Assessment is currently being prepared (Panhandle Basin Technical Advisory Team, draft).

I-5) Sensitive Species

Westslope Cutthroat Trout
Cutthroat trout have been identified in Mission Creek, both above and below the falls. Westslope cutthroat trout were stocked in Brush Lake in the 1990s and 2002 by Idaho Department of Fish and Game.

Torrent Sculpin
It is unknown if torrent sculpin inhabit the Mission Creek watershed; however, presence of torrent sculpin is unlikely due to the small size of the streams. Torrent sculpin prefer riffle habitat in medium to wide streams and rivers (Markle et al. 1996). Similar to westslope cutthroat and bull trout, the torrent sculpin is also a cold-water species and consequently its range overlaps with both these species. Analyzing effects on the westslope cutthroat trout will cover possible effects on this species.

Interior Redband Trout
It is unknown if interior redband trout inhabit the Mission Creek watershed; however, electrofishing surveys from 1996 failed to document their presence. Similar to westslope cutthroat and bull trout, the interior redband trout is also a cold-water species and consequently its range overlaps with both these species. Analyzing effects on the westslope cutthroat trout will cover possible effects on this species.

Burbot
Burbot are found only within the mainstem Kootenai River; the mainstem Kootenai River is outside the cumulative effects area for this project.

3.8 Wildlife

3.8-A. Regulatory Framework

Regulatory direction applicable to the management of wildlife resources on the Idaho Panhandle National Forest (IPNF) 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
- IPNF Forest Plan (USDA 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, and 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.

On March 4, 2005 the U.S. Fish and Wildlife Service provided the Bonners Ferry Ranger District with an updated listing of threatened and endangered species that may be present within the evaluation area (Sp: #1-9-05-SP-0154). These species include gray wolf *(Canis lupus)*, woodland caribou *(Rangifer tarandus caribou)*, bald eagle *(Haliaeetus leucocephalus)*, Canada lynx *(Lynx canadensis)* and grizzly bear *(Ursus arctos).* The only change to wildlife species from the previous list (dated April 14, 2004) was that gray wolves occurring north of Interstate 90 in Idaho are now listed as endangered. However, since gray wolves north of I-90 had previously been listed as threatened, this change does not alter the effects analysis or USFWS concurrence with the determination of effects for the Mission Brush project.

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 to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act.

On October 28, 2004 the Regional Forester updated the sensitive species list for the Northern Region. Changes from the previous (1999) list include the addition of black swift (*Cypseloides niger*), pygmy nuthatch (*Sitta pygmaea*), and fringed myotis (*Myotis thysanodes*); and removal of black-backed woodpecker (*Picoides arcticus*), northern goshawk (*Accipiter gentilis*), white-headed woodpecker (*Picoides albolarvatus*), and northern leopard frog (*Rana pipiens*). However, in a letter dated March 31, 2005 the Regional Forester placed black-backed woodpecker and northern goshawk back on the list while further data collection and evaluation were ongoing. Since these species were analyzed as sensitive species for the Mission Brush EIS, analysis and discussion for them is unchanged.

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 Bonners Ferry Ranger District are marten, pileated woodpecker, northern goshawk, and white-tailed deer. Snag habitat is considered an important habitat component for several MIS.

3.8-B. 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 section.

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 1 would not likely be affected by proposed activities because they do not have suitable habitat or are not regularly present or expected to be in or near the project area; or they are affected at a level that does not increase risk to the species or effects can be adequately mitigated by altering the design of the project. 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.

Table 3-4 Species Not Analyzed in Detail

Species	Rationale for Elimination from Detailed Analysis	Preferred Habitat
Threatened and Endangered Species		
Woodland Caribou (*Rangifer tarandus caribou*)	The project area is outside of recognized caribou habitat. No recent sightings of caribou in project area.	Above 4,000 ft. in Engelmann spruce/subalpine fir and western red cedar/western hemlock forests.
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.
Sensitive Species		
American 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.
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.
Common Loon *(Gavia immmer)*	Marginal nesting and foraging habitat. Activity areas buffered spatially and temporally.	Large, clear lakes below 5,000 ft. in elevation with at least a partially forested shoreline.
Fringed Myotis *(Myotis thysanodes)*	Suitable habitat is present in the project area for this species. Treated as a guild with flammulated owl.	Caves, mines, and abandoned buildings, large snag habitat.
Harlequin Duck *(Histrionicus histrionicus)*	No suitable habitat exists in the project area for this species.	Shallow, swift streams in forested areas.
Pygmy Nuthatch *(Sitta pygmaea)*	Suitable habitat is present in the project area for this species. Treated as a guild with flammulated owl.	Ponderosa pine habitat, especially mature-old growth stands.
North American Wolverine *(Gulo gulo)*	No suitable denning habitat in the project area. No change in prey densities or increased access to remote areas.	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.
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	Suitable habitat (e.g. roosting, maternity, hibernation) is present within the project area, but activity areas spatially buffered.	Caves, mines, and abandoned buildings.
Coeur d'Alene Salamander *(Plethodon vandykei idahoensis)*	Suitable habitat exists in the project area for this species, but will be buffered from activity as necessary.	Springs, seeps, spray zones.
Management Indicator Species		
American Marten *(Martes americana)*	Suitable habitat is present in the project area for this species. Treated as a guild with fisher.	Variable mature confer stands with canopy closures greater than 40 percent with abundant large, down woody debris.

3.8-C. Affected Environment Introduction

Ecological disturbances (e.g. landslides, fire, insect and disease outbreaks) lay the foundation for landscape patterns and strongly influence wildlife populations. Disturbances that arise from natural processes or human actions can alter these landscape patterns and wildlife habitat, directing wildlife abundance and composition. Wildlife species will occupy their preferred niche on the landscape, and move from place to place as forest structures change and different habitat

conditions develop (Clark and Sampson 1995). Consequently, wildlife species will not necessarily persist indefinitely in areas where they are found today because of the dynamic and shifting environments in which they live.

In the absence of disturbance, vegetation follows a gradual and more predictable sequence of change called succession. As vegetation moves through each stage of succession, the composition of wildlife species shifts accordingly. Wildlife species have distinctive successional strategies. Some species are more suited to the early stages of forest succession where grasses, forbs and shrubs dominate the site, while others are better suited for the later stages of forest development (e.g. old growth). Other species are habitat generalists and have adapted to a wide array of vegetation patterns.

Characterization of Habitats

The distribution and abundance of wildlife is primarily a function of habitat conditions (i.e., vegetation type and successional stage). These conditions reflect inherent fixed attributes (as depicted in the description of capable habitat in Ch. 4) as well as disturbance (i.e., fire, windthrow, landslide, and insect outbreaks) types and frequencies. In addition to altering habitat due to direct impacts (i.e., timber harvest), humans can alter habitat indirectly by influencing natural disturbance patterns. For example, fire suppression results in changes in vegetation composition and structure and subsequent susceptibility to various natural disturbances.

As discussed in the Vegetation Section (Affected Environment), fire, insect and disease, and to a lesser extent, tree harvesting have been the major disturbances that have shaped the vegetation in the Mission Brush project area. The project area can logically be subdivided into three areas of similar vegetative characteristics, referred to in this section as Brush Lake, Hall Mountain, and Mission Creek.

The Brush Lake area denotes that portion of the project area south of Highway 95. This area is generally low elevation (<4,000'), west-facing forested stands dominated by ponderosa pine, Douglas-fir or lodgepole pine. With the exception of some north facing slopes, higher elevations, and moist areas in creek bottoms, this part of the project area consists of habitat types near the dry end of the moisture gradient. The area also has a more recent fire history than the rest of the project area, most acres having sustained stand-replacing fires in 1926 and again in 1945. Past fires left some of the landscape in the early succession phase of forest development (e.g. grass/forbs, brush). Since these fires, the majority of the forested landscape has advanced toward the pole and immature size class with minor components of older forest types unaffected by the more recent fires.

Forest management practices after these most recent burns have left many of these stands in an unhealthy state. Subsequent to the 1945 burn, many acres were replanted with offsite ponderosa pine, which is nearing the end of its life span. In areas of natural regeneration, effective fire suppression has resulted in a dense secondary canopy layer that has encouraged the proliferation of shade-tolerant species. These stands have become less resistant to drought, and have become hubs of insect and fungal infestations. The current vegetative state (high fuel accumulations, available ladder fuels) has also made them prime candidates for stand-replacing fire in the future.

The Hall Mountain area denotes the dry south- and west-facing slopes of Hall Mountain outside the Mission Creek watershed. With the exception of the area near the Canadian border (1919 fire), little of Hall Mountain has been affected by recent wildfires. Most of the area is dominated by mature ponderosa pine with Douglas-fir understory, and includes about 450 acres of inventoried old growth. However, fire suppression policies are causing these stands to lose the very characteristics that are characteristic of dry-site old growth. In the absence of fire, much of the area has been converted from relatively open ponderosa pine/Douglas-fir dominated stands to denser stands encroached by young Douglas-fir and grand fir. Along with making these stands less accommodating to species that rely on open stand conditions for habitat (such as flammulated owls), these stands now risk hotter, stand-replacing fires.

The Mission Creek area contains more mesic habitats than the other two areas, including high-elevation spruce/fir forests on both sides of the drainage. A significant portion of the watershed, particularly on the east side, was affected by wildfire in the late 19th century. This area also contains a considerable amount of inventoried old growth, particularly near the headwaters of, and on the ridges above, Zion Creek. In contrast to the old growth in the Hall Mountain area, these stands are on cool and moist habitat types dominated by spruce/fir at higher elevations and cedar/hemlock near creek bottoms. Parts of the watershed within IPNF administrative boundaries, as well as several private inholdings near Mission Creek, have been heavily logged in past years. Past timber harvest has altered the habitat by removing large trees (i.e., ponderosa pine, western white pine, western redcedar, and western larch) during high-grading operations.

Methodology

The Council on Environmental Quality (40 CFR 1502.2) directs that impacts be discussed in proportion to their significance. Some wildlife require a detailed analysis/discussion to determine effects on a particular species. Others may not be impacted, impacted at a level that is inconsequential, or adequately mitigated through the design of the project. Generally, these elements do not require a detailed discussion and analysis.

The appropriate methodology and level of analysis needed to determine potential effects are influenced by a number of variables including presence of species or habitat, the scope and nature of the activities associated with the proposed action and alternatives, and risk to factors that could ultimately result in a meaningful adverse or favorable effect. The screening process tiered to the following documents and used a variety of information including scientific literature, resource inventories, and sighting records:

- Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin
- Idaho Panhandle National Forests Land and Resource Management Plan
- Available Conservation Assessments and Strategies for wildlife species

Species Habitats and Requirements

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.

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.

The IPNF has developed Forest-wide wildlife habitat capability/suitability models, which utilize TSMRS data, for five Threatened, Sensitive, and MIS wildlife species or species guilds (Canada lynx, flammulated owl/pygmy nuthatch/fringed myotis, fisher/marten, Northern goshawk, and white-tailed deer critical mid-winter range). In order to validate these models, USFS personnel conducted site visits of representative capable habitat for these species, with emphasis placed on stands modeled as “currently suitable.” Most proposed treatment areas that potentially include suitable habitat for one or more species addressed in the model were visited by the wildlife biologist or wildlife technician. A small number of proposed treatment areas were not visited by these personnel if they were determined to be obviously suitable or unsuitable for modeled species based upon field notes and unit descriptions provided by D. Nishek (project leader). Capable habitat is determined by habitat type and topographic factors. Since these do not change over time, TSMRS data presumably offer reliable information on habitat capability.

3.8-D. Species Analyzed in Detail

D-1) Threatened and Endangered Species

The following table summarizes Threatened and Endangered wildlife species analyzed in detail, the rationale for analysis, and a description of their habitats.

Table 3-5 Threatened and Endangered Species Analyzed in Detail

Species	Rationale for Detailed Analysis	Preferred Habitat
Northern Gray Wolf (*Canis lupus*)	Recent wolf activity documented near the project area. Possible presence of resident pack.	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.
Canada Lynx (*Lynx Canadensis*)	Most of project area lies within established Lynx Analysis Units. Suitable habitat affected.	Higher elevation lodgepole pine and spruce/ fir forests with adequate prey base of snowshoe hares, its primary food.
Grizzly Bear (*Ursus arctos horribilis*)	Documented recent use within the project area. Northern portion of the project area is in a designated reoccurring use area.	Habitat generalist. Denning areas isolated and remote from human development.

Northern Gray Wolf

Wolves are highly social animals requiring large areas to roam and feed. Conservation requirements of wolf populations are not fully understood, but the availability of prey and limiting the risk of human-caused mortality are considered important components (USDI 1987). The Fish and Wildlife Service identified key wolf habitats as those with: 1) a sufficient, year-round base of big game, 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient space with minimal exposure to humans. Wolves generally den on southerly aspects of moderately steep slopes in well-drained soils (or rock caves/abandoned beaver lodges), usually within 400 yards of surface water and at an elevation overlooking surrounding low-lying areas. Rendezvous sites are characterized by complexes of meadows and adjacent hillside timber, with surface water nearby (USDI 1987).

Reference Condition

The northern Rocky Mountain wolf (a subspecies of the gray wolf) was listed as Endangered in 1973. However, based on enforcement problems and a trend to recognize fewer subspecies of wolves, the entire species was listed as Endangered throughout the entire lower 48 states, except Minnesota, in 1978 (USDI 1987). In the past, substantial declines in numbers of wolves resulted from control efforts to reduce livestock and big game depredations. By the 1940s, the Rocky Mountain wolf was essentially eradicated from its range. In 1994, final rules in the Federal register made a distinction between wolves that occur north of Interstate 90 and wolves that occur south of Interstate 90, in Idaho. Gray wolves occurring north of Interstate 90 are federally listed as endangered species while wolves south of Interstate 90 are listed as part of a nonessential, experimental population with special regulations defining their protection and management.

Existing Condition

The Mission Brush project occurs north of Interstate 90 within the region where wolves are Federally listed as endangered. The Hall Mountain area contains year-round resident herds of – and is an important wintering area for – moose, elk, white-tailed and mule deer. Although no specific population numbers are available, these species are common and available enough to provide ample prey base for wolves. While overall open road densities in the

Hall/Mission Mountain area are generally high (>2 miles/square mile), there is an extensive unroaded area on the west face of Hall Mountain that could provide secure den sites.

In late December, 2005, the Idaho Department of Fish and Game (IDFG) received several reliable gray wolf sightings in the Hall Mountain portion of the Mission Brush project area. In early January, 2006, USFWS and IDFG documented the presence of a group (4-5 individuals) of gray wolves that had consumed a bovine calf within ½ mile of the project area. Subsequent efforts to trap and radio-collar one or more of these animals were unsuccessful, as the group apparently left the area shortly after they were detected. However, there have been additional reliable sightings of wolves and wolf tracks in the Hall Mountain area since the unsuccessful trapping effort.

The nearest confirmed pack of wolves is the Calder Mountain Pack, located more than 25 miles southeast of the project area. While occasional unconfirmed sightings had been reported from the Round Prairie area for a number of years, these sightings had mostly indicated the presence of transient individuals or lone wolves, unattached from a pack. Prior to the 2006 event, there was no evidence of resident wolf packs (i.e. den sites and rendezvous sites, reproduction success) in the area.

At this time, it is unclear if the Hall Mountain area is accommodating a resident wolf pack, is included in the territory of a pack that dens elsewhere, or is merely being visited by a group of wolves on a long-distance foray. In any case, there is an increased likelihood that wolves may be affected by project activities. As information becomes available, additional restrictions will be placed on Mission Brush project activities (such as temporal and spatial buffering of den/rendezvous areas) where appropriate.

Canada Lynx

Both snow conditions and vegetation types are important factors to consider in defining lynx habitat. In North America, the distribution of lynx is nearly coincident with that of the snowshoe hare, its primary prey. Lynx occur in boreal, sub-boreal and western montane forests and are uncommon or absent from the wet coastal forests of North America. Lynx habitat quality is believed to be lower in the southern periphery of its range because landscapes are more heterogeneous in terms of topography, climate, and vegetation (Ruediger et al. 2000).

Lynx are considered low-density species with home ranges averaging 24 square miles, depending on prey abundance. In northern Idaho and northwestern Montana, lynx generally occur in moist, cold habitat types above 4,000 feet elevation (Koehler and Brittell 1990). Primary habitat that contributes to lynx habitat is higher elevation lodgepole pine, subalpine fir, and Engelmann spruce habitats. Secondary vegetation, when interspersed with subalpine forests, includes cool, moist Douglas-fir, grand fir, western larch and aspen forests (Ruediger et al. 2000).

Lynx use both ends of the forest successional spectrum; young-aged stands where they hunt for snowshoe hares, and mature stands where they have their kittens. Ideally, quality lynx habitat would include a mosaic of the vegetative patterns across the landscape, providing sustainable forage in juxtaposition to denning habitat.

As a specialized predator, lynx have stratified or separated themselves from other competitors by unique adaptations. Their large feet and long legs permit lynx to move easily over the snow, enabling them to find a niche at higher elevations where snow persists much of the year, thereby, giving them a competitive advantage with other competitors (e.g. bobcats, cougars, and coyotes).

Important risk factors that can impact lynx populations include alteration of forest habitats, expansion of the range of competitors, and increased levels of human access into lynx habitat.

Reference Condition

Canada lynx were formally listed as a threatened species in March, 2000. The Canada Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000) outlines the guidelines and standards for management within identified lynx habitat. This conservation strategy was developed to provide a consistent and effective approach to conserve Canada lynx on federal lands within the United States. The LCAS sets the following standards for habitat and access management within lynx habitat:

- No more than 30 percent of lynx habitat can be in an unsuitable habitat condition at any time. Management activities would not change more than 15 percent of lynx habitat into an unsuitable condition within a 10-year period.
- Maintain denning habitat on a least 10 percent of the area that is capable of producing stands with these characteristics. Denning habitat should be well distributed and in patches larger than 5 acres.
- Manage for no net increase in open road miles in lynx habitat. Allow no net increase of regularly used or groomed over-the-snow routes and play areas.
- Maintain vegetative structure that facilitates movement of lynx along important connectivity corridors (e.g. riparian areas, saddles, ridges).

Lynx populations in Alaska and most of Canada are generally considered stable to slightly dropping. The conservation of lynx populations is of concern in the western mountains of United States because of the peninsular and disjunct distribution of suitable habitat at the southern periphery of the species' range. Both historic and recent lynx records are scarce, which makes identifying range reductions and determining the historical distribution of populations in the region difficult (Koehler and Aubrey 1994).

Existing Condition

The LCAS directs agencies to delineate lynx analysis units (LAUs) to evaluate and analyze effects of planned and on-going projects on lynx and their habitat, and provide guidance for addressing these risk factors. Both snow conditions (influenced by elevation and aspect) and vegetation types are important factors to consider in defining lynx habitat.

The northern portion of the Mission Brush project (Mission Creek drainage) lies within the Hall-Mission LAU. The Hall-Mission LAU is 12,762 acres in size and includes a mixture of lynx foraging, denning and currently unsuitable habitats. The most recent lynx habitat model shows that 9,956 acres of the LAU (78%) is capable lynx habitat. Within this, 904 acres (9%) of capable habitat is currently unsuitable, with 276 acres (3%) having been converted in the last ten year period. The model also identifies 2,636 acres (26% of capable habitat) as potential denning stands.

The portion of Hall-Mission LAU within the project area boundary contains a mix of habitat components favorably situated throughout the Mission Creek watershed. There is an ample supply of well distributed denning stands and several relatively large (>100 acres) blocks of high quality forage habitat resulting from harvest activities dating back to the early 1970's. There are also a number of smaller blocks of more recent harvest units that will begin to come into high quality forage within the next decade.

Open road density is quite high throughout the Mission Creek area, particularly on adjacent private lands. There are no large blocks of unroaded habitat in this part of the Hall-Mission LAU. A relatively large area west of Mission Creek has a low density of drivable roads, where many acres of old harvest units now supply high quality hare habitat. This area was heavily roaded in the late 1960's and early 1970's in order to access these harvest units, but in the intervening years most of these routes have become blocked by vegetation, washed out, or otherwise impassable. There is also a smaller unroaded area near the headwaters of Zion Creek, but this area is bordered to the west by steep slopes and unsuitable habitat.

Because of the high open road density in this area, there is an elevated amount of human use throughout the snow-free season. In addition, adjacent private industrial forest lands have been heavily managed in recent years. However, this area does not receive a high amount of recreational use during the winter months. There are no groomed snowmobile routes or established play areas in this part of the project area. Topography and vegetation generally limit the area snowmobilers can utilize, and the limited size of this area and lack of connectivity to other snowmobile routes makes this an unattractive destination for riders.

Grizzly Bear

Populations of grizzly bears persist in those areas where large expanses of relatively secure habitat exist and where human-caused mortality is low. Grizzly bears are considered habitat generalists, using a broad spectrum of habitats. Use patterns are usually dictated by food distribution and availability combined with a secure environment. Grizzlies commonly choose low elevation riparian areas and wet meadows during the spring and generally are found at higher

elevation meadows, ridges, and open brush fields during the summer. Habitat loss and direct and indirect human-caused mortality is related to the decline in numbers (USDI 1993).

Reference Condition
The grizzly bear was listed as threatened in 1975. It was originally distributed in various habitats throughout western North America. Today, it is confined to less than 2 percent of its original range and represented in five or six population centers south of Canada, including Cabinet-Yaak and Selkirk ecosystems that are located in northeastern Washington, northern Idaho and northwestern Montana. Habitat loss and direct and indirect human-caused mortality is related to its decline (USDI 1993).

Existing Condition

The proposed project lies just south of the International border with Canada in the Purcell Mountains, and between the Selkirk and Cabinet-Yaak ecosystems. Although the area is not designated for grizzly bear recovery, sighting and observation reports suggest the bears use the general area. In the past five years, there have been two confirmed sightings of grizzly bears within the project area: one on Hall Mountain, and the other east of Mission Creek. There is also anecdotal evidence that grizzly bears have been using this area for a number of years. This evidence indicates that most use is by subadult bears in the spring or early summer, although there are also reported sightings of adult bears and sightings later in the summer. It is believed that observations represent the southern range of a small bear population that resides south of Highway 3 in Canada (W. Wakkinen, pers. com.).

Within the approximately 43.5 square mile Deer Ridge Occupancy Area, there are about 145 miles of drivable roads and motorized trail, including 136 miles of open roads. This creates a total road density of 3.32 miles/mile^2, and an open road density of 3.12 miles/mile^2. On USFS-managed lands within the analysis area, open road density is currently 2.64 miles/mile^2, and total road density is 2.90 mi/mile^2. The portion of the project within the bear use area is approximately 7,352 acres (11.49 mi^2). There are approximately 34.98 miles of open roads in this area, creating an open road density of 3.04 miles/mile^2. High quality foraging areas (particularly huckleberry fields) are limited in the Mission Creek and Hall Mountain areas, although there is limited alpine meadow habitat around Mission Mountain in the northeast corner of the project area. There has historically been a high degree of commercial activity and high open road densities on both public and private lands in the area.

D-2) Sensitive Species

The following table summarizes sensitive wildlife species analyzed in detail, the rationale for analysis, and a description of their habitats.

Table 3-6 Sensitive Species Analyzed in Detail

Species	Rationale for Detailed Analysis	Preferred Habitat
Black-backed woodpecker (*Picoides arcticus*)	Suitable habitat is present in the project area.	Early post-fire forest stands. High densities of small-diameter snags.
Flammulated Owl *(Otus flammeolus)*	Suitable habitat is present in the project area.	Mature, old growth ponderosa pine, Douglas-fir forest.
Northern Goshawk *(Accipiter gentilis)*	Suitable habitat for goshawk nesting or foraging is present within the project area. Recent nesting activity documented.	Mature to old growth forest with relatively closed canopies.
Fisher *(Martes pennanti)*	Suitable denning and foraging habitat in the project area and potentially affected.	Mesic forested habitats
Western 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.

Black-backed woodpecker

Black-backed woodpeckers are nearly restricted to early post-fire habitat (Hutto 1995). Post-fire habitat is defined as habitat resulting from a mixed lethal or stand-replacement fire that produces an abundance of snags. They are considered forest specialists (exploiting recent forest fires), experiencing local population increases and temporary range extensions resulting from fire or insect/disease outbreaks that increase populations of wood-boring insects. While they are found in unburned forests and in areas of insect outbreaks, black-backed woodpeckers likely occur at low densities and viability may not be maintained over time without sufficient post-fire habitat (O'Connor and Hillis 2001). The availability of habitat for this species is negatively affected by the prevention of stand-replacing fires, and post-fire salvage harvesting (Hutto 1995).

Reference Condition

Historically, ecosystems in north Idaho were shaped by disturbance patterns that altered the size and distribution of forest structure across the landscape. These forests periodically experienced both small and large natural disturbances (primarily fire) that altered landscapes from less than one hundred acres to thousands of acres at a time. Before human influences, forests in different structure classes, including post-fire habitat, were randomly distributed across the landscape (Oliver 1992). Consequently, post-fire habitat for black-backed woodpeckers was maintained by these random disturbances.

Existing Condition

There have been a number of observations of black-backed woodpeckers on the Bonners Ferry Ranger District, including one in proposed Unit #129, on the north end of the Brush Creek area. Sightings have also been recorded in Hellroaring Creek and Miller Creek, just to the east of the project area. Although black-backed woodpeckers are primarily a post-fire obligate species, pockets of root disease have created an abundance of snags in localized areas. Within the project area, there are small burned areas or patches of mortality from bark beetles, but no large areas of tree mortality that would support high densities of black-backed woodpeckers.

Fire exclusion and the introduction of white pine blister rust have laid the foundation for today's vegetation patterns and habitat conditions for black-backed woodpeckers. In more recent times, snag habitat has declined in areas where timber harvesting, road construction and firewood gathering from roadsides occur. However, the change in dominance of tree species to Douglas-fir and grand fir has increased the prevalence of insect and disease (e.g. root disease, Douglas-fir bark beetle), resulting in higher levels of tree mortality. In root disease pockets and areas infected with the Douglas-fir bark beetle, higher levels of snags are present. While these snags are generally small and degenerate more quickly than snags from longer-lived, healthy trees, more shade-tolerant Douglas-fir trees replace these dead trees and in time, perpetuate the cycle of disease, creating snags in the smaller size classes. Consequently, small diameter snags (<12 inches) are relatively abundant in the Brush Lake area.

Flammulated Owl

Flammulated owls are seasonal migrants to the northern latitudes during spring and summer. They are attracted to relatively open grown, older forests of ponderosa pine and Douglas-fir that are associated with drier habitats. Reynolds and Linkhart (1992) reported that all published North American records of nesting, except one, came from forests in which ponderosa pine trees were at least present, if not dominant in the stand. The flammulated owl's preference for the ponderosa pine/Douglas-fir cover type can be linked to food availability. Reynolds and Linkhart (1992) noted a stronger correlation between prey availability and this cover type than with other common western conifers.

Reference Condition

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 has declined by approximately 80 percent from historic conditions to present.

Based on historic vegetation estimates, the ponderosa pine cover type comprised about 9 percent of the National Forests lands within the Kootenai River sub-basin. Today, only 1.5 percent of these lands consist of sites that have a similar representation of ponderosa pine (USDA NZGA draft in progress). This is an 83.5 percent change from historic conditions. Specifically, the removal of overstory ponderosa pine since the early 1900s and nearly a century of fire suppression have led to the replacement of older ponderosa pine forests by younger forests with a greater proportion of Douglas-fir.

Existing Condition

Approximately 35 percent of the Mission Brush project area represents drier forest habitats associated with flammulated owls. These drier habitats tend to produce older, single strata ponderosa pine/Douglas-fir communities, which in turn provide the necessary habitat attributes for flammulated owls.

However, similar to the findings in Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin, fire suppression policies allow the natural advance of vegetation change through time, causing a decline in habitat conditions for flammulated owls. Forest stands dominated by low densities of ponderosa pine and Douglas-fir trees, give way to more shade tolerant species, leaving a forest that is highly vulnerable to drought stress, insect and disease infestations, and high-intensity fires (Clark and Sampson 1995). Historically, fire and other disturbances intervened to rein in the advances of succession, producing healthier forests and more stable habitats for wildlife.

Presence surveys were conducted for flammulated owls west of Brush Lake between late-May and mid-June of 1993, 1999 and 2000. Surveys focused on areas that were likely to support flammulated owls based on habitat suitability. Flammulated owl surveys were also conducted in suitable habitat south of Hall Mountain (along roads 2217A & 2217C) in June from 1997-2000, and again in 2003. The west face of Hall Mountain, which potentially has the best current flammulated owl habitat in the project area, was also surveyed in 2003. No flammulated owl vocalizations have been recorded on any of these surveys in the project area.

In 1996, flammulated owl nest boxes were placed in suitable habitat west of Brush Lake and south of Hall Mountain. Surveys mentioned above included areas in the vicinity of these nest boxes, and during the survey of 2000 the boxes were visually checked for occupancy. None of the nest boxes were being utilized by flammulated owls, but subsequent research has indicated that the boxes may have been placed too low on trees (<30') to be attractive nesting sites for flammulated owls.

The analysis area encompasses 18,359 acres. Of these acres, 6,408 acres (35 percent of the analysis area) are classified as capable habitat for the flammulated owl. Currently, there are only about 364 acres (six percent of the capable habitat) that meet suitable habitat conditions. The lack of suitable habitat is due to the combination of relatively young stands, and older stands that have a dense secondary canopy layer that can prohibit foraging by flammulated owls. The majority of the 364 acres of currently suitable habitat in the project area were commercially thinned or partially regenerated in the past 30 years, which created and maintained suitable habitat conditions for the flammulated owl. Most of the capable flammulated owl habitat is concentrated on the south and west faces of Hall Mountain, and in the Brush Lake area.

Northern Goshawk

The northern goshawk is a forest habitat generalist that uses a wide variety of forest age classes, structural conditions, and successional stages, inhabiting mixed coniferous forests in much of the northern hemisphere (Reynolds et al. 1992). Throughout North America, goshawk nest sites have consistently been associated with the later stages of succession (mature and old growth trees) with moderate to high tree densities located near the bottom of hillsides on moderate slopes (Hayward and Escano 1989, Squires and Reynolds 1997, Graham et al. 1999). Foraging habitat includes a wider range of forest age classes and structures that provide a relatively open forest environment for unimpeded movement or flight through the understory.

Reference Condition

Historic numbers of goshawks were likely higher than they are today, because many of the species they prey upon were more numerous. Generally, the Bonners Ferry area historically contained a greater proportion of old growth than

currently occurs. Old growth is important for northern goshawks not only for prey species habitat but also for the large trees that provide the substrate for their substantial nest structures.

Another factor influencing goshawk habitat is the amount of understory vegetation that this generally mesic area produces. Because northern goshawks require a combination of adequate understory to provide prey species, and adequate clearance for flight maneuverability, some stands that historically were suitable for foraging are no longer suitable because of increased density of understory.

At least three suitable nest areas should be provided per home range (5,000-6,000 acres) to provide long-term nesting habitat for goshawks on the landscape. The minimal stand size for goshawk nest sites is 30 acres, with all nest sites best located within 0.5 mile of each other (Reynolds et al. 1992). Post-fledging areas have not been an issue on the IPNF because nesting habitat, not foraging habitat, appears to limit the numbers of goshawks.

Existing Condition

White pine blister rust and fire exclusion have changed the species composition of stands within the Mission Brush project area. Today's landscape contains only remnant examples of white pine, ponderosa pine and western larch. Douglas-fir, grand fir and lodgepole pine have replaced much of the growing space once occupied by these species. This change in dominance has increased the forest's vulnerability to drought stress, insect and disease infestations, and large, stand-replacing fires. This has resulted in unusually high levels of tree mortality, affecting stand structure and subsequent habitat suitability for goshawks.

Controlling wildfires since the early 1900s has also altered stand structure on the landscape. Much of the capable habitat within the project area is occupied either by immature forest stands, or mature stands that contain a high density of smaller stems in the understory. As the secondary canopy layer becomes more congested, these stands lose their effectiveness as goshawk foraging areas. In the absence of a disturbance, the healthy stands with relatively open understories are being replaced by dense Douglas-fir and grand fir regeneration.

Twenty-three goshawk territories, some with multiple nests, have been recorded on the Bonners Ferry Ranger District. There have been intensive surveys for goshawks in 1989, 1995,1996 and 2002. There are two recorded territories within the project area itself, both of which were revisited during the summer of 2002. The status of one of the nests (Mission Creek) is uncertain, while the other site (Hall Mountain) represents a recently established territory. The two sites are separated by approximately 1.5 miles.

The Mission-Brush area contains 11,167 acres of capable goshawk habitat, 1,892 acres of which are modeled as currently suitable for nesting. There are 15 contiguous nesting stands of >30 acres within the project area, but distribution is not uniform within capable habitat. Most nesting stands are concentrated in the Mission Creek area (11 stands); suitable habitat patches in the Brush Lake area (4 stands) are generally smaller and further apart. Both documented nest sites within the project area are in habitat modeled as suitable.

Fisher

Fishers are low density, forest carnivores, occurring most commonly in landscapes dominated by late-successional forests with high cover, especially in riparian areas. All habitats used disproportionately by fishers have high canopy closure with complex forest structure. They avoid areas with low canopy closure (Ruggiero et al. 1994).

Fisher habitat in the Rocky Mountains generally consists of mature and old-growth conifer forests in summer and young, mature, and old-growth forests in winter (Heinemeyer and Jones 1994). Large-diameter snags and logs are used for denning and foraging. The species prefers forests with high canopy-closure (greater than 80 percent) and avoids areas with low canopy closure (less than 50 percent) (Powell 1982). Forests within or adjacent to riparian areas appear to be particularly important to fishers (Heinemeyer and Jones 1994). In his study in north-central Idaho, Jones (1991) found that fishers generally preferred grand fir and spruce forests, and avoided dry ponderosa pine and Douglas-fir habitats. However, in winter, fishers also selected stands with relatively high basal areas of Douglas-fir and lodgepole pine. Changes in human access can affect fishers, as the species is easily trapped and over-trapping can jeopardize fisher populations.

Reference Condition

Fishers historically occupied much of the forested habitats in the northern United States (Heinemeyer and Jones 1994). Populations declined in the early 20th century, probably due to habitat loss from human settlement and logging, over-trapping, and poisoning. In the western United States, fishers have remained at low numbers or absent from their former range (Heinemeyer and Jones 1994). Population trend information for fishers in northern Idaho is unavailable, but based on sighting information, fishers are currently rare.

Existing Condition

In recent times, fishers have been documented in the northwestern part of the Bonners Ferry Ranger District, near Saddle Creek and Grass Creek, approximately 15 miles west of the Mission-Brush project area. There was also an unconfirmed sighting in the Copeland area. While there is little currently suitable habitat in the Brush Lake area, Mission Creek and associated tributaries provide many acres moist forest with relatively high canopy cover.

Most of the Brush Lake area is not capable fisher habitat because it is dominated by drier forest types intermixed by topographical areas of moist forest. In addition, more than half of the capable acres are currently unsuitable because the forest stands are too young to provide the large snags and high amount of down woody material fishers prefer. Given the small amount of currently suitable habitat, and the fragmented nature of capable habitat, it is unlikely that this area would be highly utilized by fishers, assuming they were present.

By contrast, almost all of the Mission Creek drainage is capable fisher habitat, and more than one-third of these acres are currently suitable. Most of the currently unsuitable habitat in this area has a history of past timber harvest. The remainder is modeled as unsuitable because the stands are classified as immature, although many originate around the turn of the century. It is likely that many of these stands could provide fisher denning, as well as foraging, habitat. So, while fishers have not been documented within the project area itself, their presence will be assumed for analysis purposes. The fisher habitat suitability and capability models indicate that 9,263 acres of capable fisher habitat are present within the project area, 2,296 acres of which are currently suitable.

Western Toad

Western (boreal) toads are found in a wide variety of habitats including wetlands, forests, and floodplains in the mountains and mountain valleys. Breeding takes place from May to July in shallow areas of large and small lakes, beaver ponds, temporary ponds, slow moving streams, and backwater channels of rivers. After a brief spring breeding season, adult toads leave aquatic habitats and travel to a variety of upland habitats. Adults and juveniles overwinter and shelter in underground caverns, or more commonly in rodent burrows. Adults may move more than four kilometers away from water after breeding and can remain away from surface water for relatively long periods of time. Juveniles also may disperse more than four kilometers from their natal sites (Maxell 2000). As a result of these findings, the Northern Region Regional Forester listed the Western toad as a sensitive species.

Reference Condition

Survey results combined with incidental observations indicate that this species is found throughout much of northern Idaho. While toads may be widespread across the landscape, it is unknown in what proportion of suitable habitat they occur. Surveys conducted in the northern Rocky Mountains in the 1990s revealed that toads were absent from a large portion of their historic range and occupied only a small proportion of suitable habitat (Maxell 2000).

Steep roadcuts can be a barrier to toads moving between seasonal habitats, but roads can also provide a barrier-free travel corridor that then provides opportunities for mortality. Juvenile toads are vulnerable to being killed by motorized vehicles when they are dispersing from their natal ponds.

Existing Condition

Western toads are widespread and common on the Bonners Ferry Ranger District. They are known to breed from the Kootenai River Valley to all but the highest elevations. There is no evidence of decline on the district; however, it is assumed that numbers were greater in the past primarily because of the loss of wetland habitat. An increase in roading,

particularly in developed, low elevation areas, may be a mortality factor. Within the project area, the best toad breeding habitat is likely Brush Lake and the wetland complex immediately north of the lake.

D-3) Management Indicator Species and Others

The following table 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 3-7 Management Indicator Species Occurring on the Idaho Panhandle National Forests

Species	Rationale for Detailed Analysis	Preferred Habitat
Pileated woodpecker (*Dryocopus pileatus*)	Suitable habitat exists within the project area.	Forests with tall, large diameter dead or defective trees for nesting.
White-tailed deer *(Odocoileus virginianus)* 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 relatively common in both cut and uncut mid-elevation forests. They appear to do well in a matrix of forest types (Hutto 1995). However, since foraging habitat represents a wider ecological range of forest age structure, nesting habitat is considered the most critical and limiting feature for pileated woodpeckers.

The pileated woodpecker was selected as a MIS because its highest densities occur in old-growth forests and they need large dead trees for nesting and dead woody material (standing and down) for foraging (Bull et al. 1990). They have specific requirements for nesting, which consist of large trees in relatively uncut stands for nesting purposes. Nest cavities are usually located more than 30 feet above the ground, at a level with the canopy of the surrounding forest (Warren 1990).

Reference Condition

As discussed previously in the black-backed woodpecker section, snag habitat within the Brush Lake area has been strongly influenced by vegetation succession and natural fire events. Most of the snags created by past wildfires have yielded to repeated lethal fires or have since fallen. Since the 1940s, the landscape has progressed and is dominated by 70-80 year-old trees. Consequently, there is only a small amount of old growth and few large-diameter snags associated with this area. Remnant western larch and ponderosa pine snags occur infrequently throughout the project area.

By contrast, the northern portion of the project area (Mission Creek and Hall Mountain) has not experienced stand-replacing wildfire for over 100 years, and consequently contains remnants of both dry-site and mesic site old-growth. While a sizeable part of the Zion Creek drainage has experienced regeneration harvest in relatively recent (<35 years) times, there are still extensive areas of forest within the Mission Creek drainage that are currently supplying large diameter snags.

Existing Condition

The change in species composition resulting from white pine blister rust and fire exclusion has slowly and methodically replaced such species as ponderosa pine, white pine and western larch, trending stands toward smaller and younger size classes or more shade-tolerant tree species. Consequently, snag production is shifting from the larger, longer-lived species to the smaller, shorter-lived species. This condition is affecting the long-term stability and persistence of large snag habitat in the Mission Brush assessment area. Consequently, the habitat in this area is in decline for species associated with large snags, such as the pileated woodpecker.

The drier west and south faces of Hall Mountain are suffering a fate similar to stands in the Brush Lake area, as dry-site species are being replaced by more shade-tolerant species. However, unlike the Brush Lake area, this portion of the project area has not experienced recent stand-replacing fires, and therefore is currently supplying a high density of large snags.

The Mission Creek area, like Hall Mountain, has not suffered from lethal fires in recent times, and also provides large diameter snags throughout most of the area. Unlike Hall Mountain, these forests are dominated by more mesic species such as western redcedar, spruce and subalpine fir. However, there are remnant ponderosa pine and larch, as well as large cedar and Douglas-fir individuals, scattered throughout many of these stands that provide suitable nesting and foraging habitat for pileated woodpeckers. Due to the more mesic nature of these stands, this area is likely to be less heavily utilized by pileated woodpeckers.

National Forest lands within the project area contain approximately 5,195 acres of mature forest (sawtimber or old growth) that may be providing pileated woodpecker nesting habitat. This assessment does not include stands dominated by Engelmann spruce or subalpine fir, as pileated woodpeckers have not been observed nesting in these forest types on the District. The project area contains 13 areas of at least 100 acres of contiguous mature/old forest habitat. Similar to the goshawk habitat analysis, most of these contiguous potential nesting patches are found in the Hall-Mission portion of the project area (nine), since a more recent fire history has left the Brush Lake area with fewer acres of mature and old growth stands.

White-tailed Deer

White-tailed deer are very adaptable and prolific, and thrive in a variety of habitat types and seral stages. They are also tolerant to disturbances, such as agriculture and forestry practices, and prefer these areas if an adequate arrangement of cover and forage is available.

Throughout much of north Idaho, prolific amounts of vegetation provide excellent concealment and security cover for white-tailed deer. Consequently, due to their secretive behavior and the availability of dense vegetation, the effects of harvest on the population tend to be extremely limited (Compton 1999). Severity of winter appears to be the most limiting factor (Compton 1999).

Climatic factors affect the seasonal variation of forage quality and quantity, accessibility to foraging areas and the energetic requirements to the animal (Pfingsten 1983). Consequently, winter can be a very stressful period and a limiting factor for white-tailed deer. It is during this period that forage is scarce and travel is energetically very expensive. To ameliorate these effects, deer will concentrate at lower elevation and on smaller, confined areas known as critical winter range, especially during severe winters with high snow accumulations.

Reference Condition

Historically, white-tailed deer flourished in the 1800s, but by the early 1900s their populations were reduced to low numbers due to over-exploitation by trappers, miners and settlers. White-tailed deer populations have rebounded to a point where they are probably near all time highs for the state (Compton 1999).

Existing Condition

The small amount of low elevation habitat limits the availability of winter range for white-tailed deer. Browse species are widespread on the south and west facing slopes of Hall Mountain and in the Brush Lake area. Much of the shrub component is decadent or too tall to be utilized as big game forage. Aspen, which can produce abundant winter browse, is declining due to conifer encroachment.

Critical winter range is also somewhat limiting within the project area since most low elevation forests are on dry habitat types. The habitat suitability model identifies 2,169 acres within the project area that are capable of producing critical winter range. Currently, only 184 acres are providing this habitat component. These stands are concentrated along US Highway 95 in the lower Mission Creek drainage.

Forest Land Birds

Reference Condition

Hejl (1994) acknowledges that while we do not know all of the specifics of bird-habitat relations, we do understand many principles that would help maintain a healthy forest for most bird species: 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 forest birds.

Idaho has 243 species of birds that breed in the state (Idaho Partners in Flight 2000). A diversity of vegetation and topography results in a diversity of species. While all birds are important for their roles in the ecosystem, not all birds and habitats are equal when it comes to threats to their persistence. Idaho Partners in Flight (IPF) 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).

Existing Condition

Large scale fires of the 1800s that reburned in the early 1900s, in combination with fire suppression and the introduction of blister rust, have led to today's vegetative conditions. Today, most dry-site communities in the Mission Brush assessment area have become congested by dense understories of shade-tolerant species. If this important habitat component continues to withdraw in extent, forest land birds dependent upon open-grown dry-site conditions will decline. No single forest condition or structural type will benefit all species. Providing a mosaic of habitat conditions containing a variety of habitat components or niches will maximize habitat values for forest birds.

3.9 Recreation Existing Condition

Lands within the analysis area have a long history of motorized and non-motorized recreational use. They include a wide range of natural and developed settings within a one-hour drive of Bonners Ferry, Idaho; Creston and Cranbrook, British Columbia. They are easily accessed via State Highway 1 and U.S. Highway 95 in addition to Forest Service roads. The U.S. Highway 95 corridor and Brush Lake are parts of the Bonners Ferry Ranger District's Watchable Wildlife loop. Both Highways 95 and 1 are touted in many tourism guides as scenic, recreational travel routes. The analysis area, to some degree, is visible from both highways.

Physically, landforms vary from dramatic rock outcrops on the northwest side of the analysis area to pastoral farmlands along highway corridors and include unusual ponds and wetlands around Brush Lake. Peaks in the area range in elevation from 5500 feet to 6200 feet. Long-range vistas are not common. The general setting of the analysis area is natural appearing; yet evidence of human activities such as highways, timber harvest, roads, and developed campsites are predominate.

3.9-B. Recreation Review of Cumulative Effects of Past Harvest Activities

The past timber sale activities on private land have been reviewed by the district's recreation specialist (see section 3.3-B discussion of the types of effects and Appendix A Table A-1 for listings of past activities). No effects were found that were not accounted for in the Existing Condition portion of this SFEIS. The current condition and effects of implementing an action alternative are explained in the Recreation sections of Chapters 3 and 4.

3.9-C. Recreation Use

Recreational use has significantly increased in the last 20 years. Recreational traffic along both highway corridors has expanded enormously. There is greater demand for recreational facilities than ever before. Lands in the Purcell Mountains play a very important part in the recreation opportunities provided on the Bonners Ferry Ranger District. Limitations on motorized use on most of the rest of the district make these lands that are open to motorized recreation, unique. Areas that were at one time considered a low priority for recreation now offer opportunities for ATV or motorcycle trails, as well as opportunities for car camping, driving for pleasure, and snowmobile use. More than 40 miles of open road are available for recreational access in the project area.

Lands in the analysis area accommodate a diversity of activities ranging from car camping, huckleberry picking, hunting and fishing, to horseback riding, rock climbing, and day hikes. Due to terrain and already developed access, these lands provide some of the best potential on the district for fully accessible recreation activities. Recreational day use is high along roads throughout the analysis area and surrounding Brush Lake. Although the highest seasons of use are summer and fall, the low elevations and easy access allow full year recreation opportunities. On occasion, during a low snowfall winter, driving to Brush Lake is feasible so one can enjoy ice fishing at Brush Lake.

Alternative educational schools also use the area for recreational/educational activities under Special Use Permits issued by the Bonners Ferry Ranger District; however, this type of use is occasional. These schools commonly model the National Outdoor Leadership School or Outward Bound program. Outdoor activities to gain self-reliance and hands-on nature study are paramount aspects of their educational programs. Several of these schools are located within Boundary County. Existing special use permits outline allowable activities within the analysis area.

Demographically most use is from the local area (as far as Coeur d'Alene, Idaho about 90 miles to the south) rather than from long distance tourism. Day use, fishing, swimming and picnicking are the most popular forms of recreation. Occupancy of the campground will vary from one or two sites during an average weekday, to all the developed sites, plus nearby undeveloped areas, during a high-use weekend. The expected re-route of U.S. Highway 95 will necessitate a change in National Forest access to Brush Lake. Use is expected to increase due to greater accessibility and trends in population dynamics.

Brush Lake is one of the most heavily vandalized recreation sites on the Bonners Ferry Ranger District. The lack of electricity, water, and sewage disposal, make recruitment of volunteer campground hosts nearly impossible. Any deterrent to vandalism will have to be engineered into the recreation site design.

C-1) Developed Sites

Brush Lake, with adjacent campground and a day use area, is the only developed recreation site in the analysis area. The campground and day use area are located approximately 20 miles from Bonners Ferry, at the ends of Forest Service Roads 2493 and 1004, respectively. The campground; with four sites, a vault toilet and 10-foot x 40-foot boat ramp, is the smallest on the Bonners Ferry Ranger District. The day use area consists of the primary boat ramp, a 20-foot fishing dock, two picnic sites, parking facilities for 10 automobiles, and a vault toilet.

Brush Lake recreation facilities are non-fee sites.

Brush Lake is a 34-acre, low elevation lake with a very long season of use. The lake's proximity to U.S. Highway 95 allows easy access. Brush Lake, stocked regularly, is an excellent choice for beginning anglers and is renowned for its fishing opportunities.

Beaver ponds and wetlands to the north of the lake provide excellent wildlife habitat. Waterfowl, osprey, herons, grouse, moose, and deer are common. Sightings are typical enough that Brush Lake has been identified as a Watchable Wildlife site.

C-2) Facilities

The facilities at Brush Lake will accommodate a total of 61.5 Persons at One Time (PAOT); 34 persons at one time in the camping area and 27.5 persons at one time in the day use area. Average utilization from May through September is 35%, with 100% utilization on most weekends. Large group use, (15-30 people) is very typical on Sunday afternoons throughout the summer.

Both Brush Lake sites were developed independently as fiscally acceptable remedies to immediate problems. Preliminary survey work and conceptual designs were done in the early 1960's. Since that time, no comprehensive, long-term management plan or engineering survey has been completed. The initial designs are outdated and inconsistent with current recreation trends and environment.

Although large group use is typical at Brush Lake, there are no group sites to accommodate the use. This results in increased use of random camping in undeveloped areas.

The nearest power source is one to two miles from the lake. There are no current plans to extend power lines towards the lake. Neither the campground nor the boat launch/picnic site has electricity or a potable water system. A water supply survey completed in 1964 suggests that well sites are limited, with only a 50 percent chance of success. A second survey completed in

2002 confirmed the original findings. The nearest community water association is not inclined to accept the Forest Service as a new member due to the significant additional expense and pumping requirements they would have to assume to include Brush Lake in the association. Pumping and purifying water from the lake would be exceptionally expensive. Existing vault toilets in the campground and the day use area are in very poor condition. Neither toilet is universally accessible.

Access roads into both recreation sites are in poor condition, pot-holed, narrow, and without appropriate turnouts. Signing from the highway is inadequate. The road accessing the southern-most campsites offers no loop or turn-around. When the sites are occupied, exiting is difficult. Parking spurs at the campground need to be identified, reshaped, and leveled. Several of the spurs could be extended. Nearby, undeveloped, camping sites should be included in the existing campground.

The general parking and toilet location for the campground area was designed in conjunction with the concrete boat ramp. Because this ramp is no longer used, the developed parking area is rarely used. Both the parking area and the toilet are remote from most of the camping sites that are currently being used.

Failure of the outlet dam lowered the lake four to six feet, making the concrete boat ramp at the campground ineffective. A second boat ramp, the one now in use, was created by pushing fill into the lake. This ramp is located in the day use area and does not meet Forest Service design or safety standards.

The path connecting the campground and the boat launch/picnic-site is very steep in places, with rocky, uneven tread. It is the only developed lakeside access, and is inadequate and unsafe for the type of use Brush Lake receives. Signing is poor or non-existent

At the day use area, the parking area is unattractive and congested. Access to the fishing dock, boat ramp, lakeside trail, and parking for one of the picnic areas, is all located at one end of the parking area. Traffic patterns overlap. The designated parking is inadequate for long vehicles or vehicle/trailer combinations.

The approach to the fishing dock is a steep stairway and ramp. Neither the stairs nor the ramp is universally accessible. In fact, in wet weather or low water, either can be dangerous due to the pitch. The fishing dock is 20 feet long and inadequate for current use.

The picnic sites are in poor locations. The most popular site overlooks the boat ramp and fishing dock; however, it is small and is bordered by the trail on one side. The second picnic area is above the parking area and is accessed by several stairs made from railroad ties. It is rarely used. Neither site is universally accessible.

Campground amenities (fire rings, picnic tables) are deteriorating and are not universally accessible. Tent pads are nonexistent. There is little or no vegetative screening between campsites.

Despite the inadequacies and safety concerns, Brush Lake has ardent and outspoken local support with a general concern to retain its rustic nature.

After the Brush Lake Fire of 1945, “off site” ponderosa pine plantations were planted on the west side of the lake. As a consequence, both developed recreation sites are surrounded by dead or at risk timber stands. Best estimates put the life expectancy of the existing stand at five years. Both the camping and the day use areas need long-range vegetation management plans.

C-3) Trails

Current Trails

Mission Mountain Trail #156
This trail roughly follows the northeast boundary of the analysis area. It is a moderate, 2-mile ridge walk and is widely used by elk and deer hunters. The trail is currently open to all non-motorized trails uses, and motorcycle riding. The trail is unsuitable for and closed to ATV use. Views from Mission Mountain are scenic and unlike any other trail on the District. Trail #156 connects with Arndt Trail #409 to the east, just outside the analysis area. The Mission Mountain trailhead is signed; but without benefit of parking and turnaround facilities, both parking and turning around are difficult. Within a mile of the trailhead, Road 2206 cuts across the trail. In the fall, the road is closed by a gate for elk security; it is open the rest of the year. The trail crossing was not considered in the road construction; the trail is steep and unimproved across the road fill and cut slopes. There is no parking area at that crossing.

Historic Trails

The Hall Mountain area does have some historic trails. Although portions of them remain, they were dropped from the district trail system in the mid 1960s due to budget constraints. It is not uncommon that landowners and forest users cut them open to some degree. Although they may offer some opportunities not available in other parts of the district, they have not been fully analyzed in terms of current recreation potential.

The Wildhorse Trail is probably the most significant historic trail in the area because of its key role in the early development of northern Idaho and southeastern British Columbia.

Trail Use

All Terrain vehicle (ATV) use is significant and increasing throughout the analysis area. ATV enthusiasts use every available spur road and open Forest Service road in the area. In large areas of gentle terrain, cross-country ATV use is common but limited to old skid trails, because of the thick forest, brush and downed trees. There are no designated ATV trails in the planning area.

Mountain biking is gaining popularity in the area. No trails are designated for mountain biking, but most of the roads and some of the less often-maintained spur roads are suitable for mountain biking traffic. There are no groomed or signed winter trails in the planning area.

C-4) Dispersed Recreation:

Dispersed camping opportunities are ample. Almost all open roads in the analysis area have user-developed campsites just outside the road prisms. Campsites are typically located next to a stream or tucked in a clump of mature timber. Although accessible by road, the overall feeling is one of naturalness and distance from rural human development. Most of those sites have one, if not more, campfire rings as well as a variety of shelter poles, shelves, and seats constructed with native materials. Trash and firewood debris are typical at these sites, but not to the degree noticeable in other areas of the district. Almost every possible campsite is filled during the huckleberry and hunting seasons.

In addition, day use along the open roads is very high throughout the analysis area. Driving for pleasure is one of the most consistently popular activities in this area. Gathering forest products (berries, Christmas trees, firewood, mushrooms, etc.) is a major activity within the analysis area.

Winter use is moderate and comprised primarily of local enthusiasts.

Chapter 4 – Environmental Consequences **4-1**

4.1 Introduction *4-1*

4.2 Changes between the 2004 FEIS/ROD and the Supplemental FEIS *4-1*
4.2-A. New Information Related to the Environmental Consequences 4-1
A.1- Past Harvest Activities 1
A.2- Soils 2

4.3 Forest Vegetation – Mission Brush Project Area *4-5*
4.3-A. Forest Composition 4-5
A.1- Alternative 1 - No Action 4-5
A.2- Alternative 2 4-8
A.3- Alternative 3 4-9
A.4- Alternative 4 4-9
A.5- All Action Alternatives 4-10
4.3-B. Forest Structure 4-11
B.1- Alternative 1 4-11
B.2- Alternative 2 4-12
B.3- Alternative 3 4-13
B.4- Alternative 4 4-14
4.3-C. Forest Openings 4-15
4.3-D. Risk of Stand-Replacing Fire in Dry Forest Types 4-17
D.1- Alternative 1 4-17
D.2- Alternative 2 4-18
D.3- Alternatives 3 and 4 4-18
D.4- All Action Alternatives 4-19
4.3-E. Insects and Diseases 4-22
E.1- Direct, Indirect & Cumulative Effects 4-22
4.3-F. Air Quality 4-23
F.1- Conducting Burns and Monitoring Air Quality 4-23
4.3-G. Restoration Costs 4-28
G.1- Alternative 1 4-28
G.2- Alternative 2 4-28
4.3-H. Reasonably Foreseeable Actions 4-29

4.4 Old growth *31*
4.4-A. Recommendations 31
4.4-B. Changes between the FEIS/ROD and the SFEIS 31
4.4-C. Consistency with the Forest Plan 4-32
4.4-D. Reforestation 4-37
4.4-E. Lands Suitable for Timber Production 4-37

4.5 Aquatics *4-38*
4.5-A. Methodology 4-38
A.1- The WATSED Model – Supplemental Information 4-38
A.2- Aquatics Review of Cumulative Effects of Past Harvest Activities 4-38
A.3- Water Yield 4-38
A.4- Sediment Yield – Analysis 4-39
4.5-B. Water Yield modeled by WATSED 4-43
B.2- Direct and Indirect Effects Common to All Action Alternatives (2, 3, 4) 4-45
4.5-C. Cumulative Effects Analysis Area 4-46
C.1- Brush Lake Recreation Proposal – Effects Common to Alternatives 2, 3, and 4 4-46
C.2- Past, Present and Reasonably Foreseeable Actions 4-47
C.3- Cumulative Effects to Aquatics – All Action Alternatives 4-49
C.4- Cumulative Effects to Fisheries 4-50
4.5-D. Consistency with the Forest Plan and Other Regulations 4-51
D.1- IPNF Forest Plan 4-51
D.2- Changes between the 2004 FEIS/ROD and the Supplemental FEIS 4-51
D.3- Endangered Species Act (Fisheries) 4-51
D.4- National Forests Management Act – Species Viability 4-51

D.5- Clean Water Act, including State of Idaho 4-51
D.6- Idaho Forest Practices Act 4-52
D.7- Executive Order 12962 4-52
D.8- State of Idaho Governor's Bull Trout Plan 4-52

4.6 Wildlife *4-52*
4.6-A. Cumulative Effects Analysis 4-52
4.6-B. Threatened and Endangered Species 4-54
4.6-C. Sensitive Species 4-63
4.6-D. Management Indicator and Other Species 4-82

4.7 Recreation *4-90*
4.7-A. Effects common to all action alternatives 4-90
A.1- Recreation Opportunity Spectrum 4-90
4.7-B. Forest Plan Consistency 4-91
4.7-C. Current and Desired Future Conditions 4-91
C.1- Developed Sites 4-91
C.2- Trails 4-91
C.3- Dispersed Recreation 4-91

4.8 Required Disclosures *4-92*
4.8-A. Irreversible and Irretrievable Commitment of Resources 4-92
4.8-B. Unavoidable Adverse Environmental Effects 4-93
4.8-C. Relationship between Short-term Uses and Long-term Productivity 4-94
4.8-D. Possible Conflicts with Other Federal, State or Local Policies, Plans or Regulations 4-94
4.8-E. Other Required Disclosures 4-94

List of Tables

Table 4-1. Treatment Areas in Alternative 2 that are Not included in Alternative 4 4-14
Table 4-2. Openings Greater Than 40 Acres (Alternative 2) 4-16
Table 4-3. Openings Greater Than 40 Acres (Alternative 3) 4-16
Table 4-4. Openings Greater Than 40 Acres (Alternative 4) 4-17
Table 4-5. Prescribed Burning Air Quality Analysis, Alternative 2 4-25
Table 4-6. Prescribed Burning Air Quality Analysis, Alternative 3 4-26
Table 4-7. Prescribed Burning Air Quality Analysis, Alternative 4 4-27
Table 4-8. Restoration Costs for Alternatives 2, 3, and 4 4-29
Table 4-9. Old Growth Stands with Proposed Treatments – All Alternatives 4-32
Table 4-10. Summary of proposed road treatments in miles 4-42
Table 4-11. Project impact zones for species analyzed. 4-53
Table 4-12. Issue indicators used to measure effects 4-53
Table 4-13. Effects of proposed activities on habitat indicators for the Hall-Mission LAU. 4-57
Table 4-14. Effects of proposed activities on lynx habitat components for the Hall-Mission LAU. 4-57
Table 4-15. Combined effects of Mission Brush alternatives and Northern Prairie proposed action on lynx habitat indicators for the Hall-Mission LAU. 4-60
Table 4-16. VSS percentages* within Mission-Brush Project Area 4-72
Table 4-17. VSS percentages* within Hall/Mission portion of Project Area 4-73
Table 4-18. VSS Percentages* Within Brush Lake portion of Mission Brush Project Area 4-73
Table 4-19. Exisitng Condition and Projected Effect of Alternatives on Goshawk PFA for known nests in the Mission Brush Project Area 4-74
Table 4-20. Existing Condition of Forested Habitat on NFS Lands in Mission Brush Wildlife Analysis Area and Subdrainage Guidelines 4-77
Table 4-21. Existing condition and projected effects of alternatives on forest structure of fisher/marten habitat in the Mission Brush Project Area. 4-78
Table 4-22. Existing Condition and Projected Effects of Alternatives on Hypothetical Pileated Woodpecker Home Ranges in the Mission Brush Project Area 4-85

List of Figures

Figure 4-1. Alternative 1 - General Forest Trends 4-5
Figure 4-2. Changes in Forest Composition Over Time with No Timber Harvest or Underburning 4-7
Figure 4-3. Mission Brush Project Area Species Distribution from a Historical Perspective 4-8
Figure 4-4. Acres of Forest Composition Trended toward sustainable conditions through Restoration Treatments 4-10
Figure 4-5. Projected Size Class Distribution with Natural Disturbances - Alternatives 1, 2, 3, and 4 4-12
Figure 4-6. Mission Brush Forest Structure – Historic and Projected (Alternative 1) 4-12
Figure 4-7. Historic vs. Projected Forest Structure (Alternative 2) 4-13
Figure 4-8. Historic vs. Projected Forest Structure (Alternative 3) 4-14
Figure 4-9. Historic vs. Projected Forest Structure (Alternative 4) 4-15
Figure 4-10. Erosion Following a Wildfire 4-18
Figure 4-11. Dry Forest Stand Conditions Following Wildfire in 35 Years 4-20
Figure 4-12. Cause And Effect Flow Chart For Regeneration Harvesting 4-21
Figure 4-13. U.S. Highway 95 Realignment - Project Now Complete 4-30
Figure 4-14. District-wide Even-Aged Regeneration Harvest History (Bonners Ferry Ranger District) 4-34
Figure 4-15. Mission Brush Old Growth Patches (South of Hwy 95) 4-35
Figure 4-16. Mission Brush Old Growth Patches (North of Hwy 95) 4-36
Figure 4-17. Alternative comparisons of increases in sediment yield over existing conditions within Lower Mission Creek Watershed. 4-41
Figure 4-18. Comparisons of water yield for Lower Mission Creek for all alternatives. 4-43

Chapter 4 – Environmental Consequences

4.1 Introduction

This chapter discloses the results of the analysis and describes the probable direct, indirect and cumulative effects to specific resources in the Mission Brush project area. It outlines the probable environmental consequences of implementing any one of the alternatives described in Chapter 2; including associated post harvest work such as sale area improvement activities and slash disposal. Chapter 4 forms the scientific and analytical basis for the comparison of alternatives. Impacts to resources described in this chapter are linked to the alternative driving issues discussed in Chapter 2. Both positive and negative effects are considered. Environmental consequences that relate to issues discussed in Appendix A are not described in this chapter.

This Supplemental EIS includes discussions that are related to the new information received after release of the Final EIS in 2004 (*Lands Council v. Powell* 395 F.3d 1019 - 2005 amended opinion Ninth Circuit Court) and other resource-specific items such as updated listings for wildlife species, and the Forest Plan Amendment regarding Fry Emergence. Unless indicated otherwise, the discussions of the following items are located at the beginning of the appropriate resource narratives.

- Past Harvest Activities and their contributions to the cumulative effects of this proposal
- Soils analysis of probable effects
- WATSED Model analysis of probable effects
- Old Growth analysis of probable effects
- Data for Wildlife and Fisheries analysis of probable effects
- Fry Emergence analysis for Fisheries

4.2 Changes between the 2004 FEIS/ROD and the Supplemental FEIS

To assist the public and decision maker, new information in response to the Ninth Circuit Court's opinion is displayed in two-column format; information from the 2004 Final EIS is displayed in single-column format.

4.2-A. New Information Related to the Environmental Consequences

This portion of Chapter 4 focuses on two items of new information received after release of the Final EIS:

- Past Harvest Activities and their contributions to the cumulative effects of this proposal
- Soils analysis of probable effects

The following items related to the new information are discussed within the appropriate resource sections of Chapter 4:

- WATSED Model analysis of probable effects (Aquatics section)
- Old Growth analysis of probable effects (Old Growth section)
- Data for Wildlife and Fisheries analysis of probable effects (Aquatics or Wildlife section)
- Fry Emergence analysis for Fisheries (Aquatics section)

A.1- Past Harvest Activities

Past timber harvests need to be described in suitable detail (time, place, type and scale) including a sufficiently detailed explanation of the effects of different harvest methods in order to promote an informed assessment by the public and agency personnel[1].

This EIS contains information regarding past timber harvest within the Mission Brush project area; activities on private lands and on National Forest System lands are described Chapter 3. These activities were included in the analysis and documentation as follows:

- Effects to Vegetation
- Effects to Aquatics cumulative effects
- Effects to Wildlife
- Effects to Recreation

a. Summary of Past Harvest Activities

Information regarding past timber harvest on private lands within the Mission Brush project area is included in Chapter 3 (see Chapter 3, sections 3.3-A and 3.3-B; and Appendix A Tables A-1 and A-2 and associated discussion for more information). Past harvest activities were considered during preparation of the existing condition descriptions for each resource. The activities were also considered, when appropriate, for cumulative effects analyses. Summaries are included below; more detailed discussion is contained within the narratives of the vegetation, aquatics, wildlife and recreation resources.

b. Soils Review of Past Harvest Activities

The soils analysis by its very nature and design includes past activities that have occurred on a given location. See the Soils section in Appendix A for information on how the methodology utilizes knowledge of past activities.

c. Aquatics Review of Cumulative Effects of Past Harvest Activities

As explained in section 4.5-A.2 of this chapter, past activities that were relevant to the watershed and fisheries cumulative effects analysis are included in the analysis of cumulative effects. Others, such as tree planting and firewood gathering, do not result in soil or watershed disturbance so they aren't included in the discussion. The activities on private lands were considered during analysis and preparation of the 2004 FEIS/ROD; thus there are no changes to the aquatics/fisheries cumulative effects conclusions between the 2004 FEIS and the 2005 Supplemental FEIS for this project.

d. Old Growth Review of Cumulative Effects of Past Harvest Activities

Analysis for old growth inherently includes analysis and review of past harvest activities since they have a very direct bearing on the characteristics of timber stands. However, old growth conditions for a given project do not factor in conditions on non-federal ownerships, nor do they rely on these areas since they are subject to adverse changes based on the objectives of the landowner (agricultural or residential development, conversion to non-forested lands, etc.). The old growth analysis did include past activities on National Forest System lands in determining the cumulative effects for this project.

e. Wildlife Review of Cumulative Effects of Past Harvest Activities

The past timber sale activities on private land have been reviewed by the district's wildlife biologist. No effects were found that were not accounted for in the Existing Condition portion of the 2004 FEIS. The current condition and effects of implementing an action alternative are explained in the Wildlife sections of Chapter 3 and 4.

f. Recreation Review of Cumulative Effects of Past Harvest Activities

The past timber sale activities on private land have been reviewed by the district's recreation specialist. No effects were found that were not accounted for in the Existing Condition portion of the 2004 FEIS. The current condition and effects of implementing an action alternative are explained in the Recreation sections of Chapter 3 and 4.

A.2- Soils

a. Background

For this document, the soils discussion is located in Appendix A and describes the *cumulative impacts* to the soil resource from the previous timber sale activities, and the estimated impacts to the soil resource for all alternatives in the Mission Brush analysis area.

b. Design Criteria, Mitigation Measures, and Potential Effects of Alternatives

As stated in Chapter 2 sections 2.8 items A.1-j, A.2-d, and A.3-4 the design criteria and mitigation measures for this project have been shown to be highly effective in reducing impacts to the soils in managed areas.

Alternative 1 - The existing condition is shown in column five of the table *Existing Conditions and Potential Impacts Following Guidelines in Niehoff* (2002) Appendix A, Table A-7)for easier comparison of conditions "before and after" proposed management activities.

Alternatives 2, 3 and 4 – currently exceeds Region One standards for percent detrimental compaction; but, the compaction is not expected to increase due to the mitigation measures that would be applied in this unit.

Because the harvest systems that would be used in each unit are the same for each action alternative, the impacts to soils in the treated areas would be the same. The variation between alternatives would be from differences in the number of acres treated and the number of treatment units.

Compared to Alternative 2, Alternative 3 would treat approximately 600 fewer acres. Alternative 4 would treat approximately 1000 fewer acres. Alternative 4 includes Unit 16; Alternative 3 does not.

Ecosystem burning – 238 acres in Alternatives 2 and 4 only. Impacts to the soil resource from the ecosystem burn will be marginal because no soil compacting (ground-based) equipment would be used. Prescribed burning would only occur when soil moisture levels are greater than 25 %, thereby keeping the risk of detrimental soil heating to a minimum. Thus detrimental changes to the soil structure and chemistry are unlikely, as stated in the Region 1 Soil Guidelines.

Girdling of Mistletoe infected trees: Because they do not involve use of ground-based heavy equipment, units proposed for girdling (21, 43, 51, 52, 54, and 55) are not included in the soil table. As explained in the description of Alternative 2 in Chapter 2, girdling of mistletoe infected trees in and around existing and proposed regeneration units would be used to alleviate the spread of the parasitic plant directly into the understory of young healthy larch. The girdled trees would be left as wildlife trees, depending on the snag quota in the unit (Table 2-8).

c. Ongoing and Reasonably Foreseeable Activities

National Forest System Lands - National Forest System lands comprise about 70% of the ownership within the Mission Brush project area. Present activities on these lands have inconsequential effects on the soil resources within activity areas (treatment units).

Activities that might occur within any given activity area could include huckleberry picking, hunting, and firewood gathering. Equipment such as pickups or skidders are prohibited off the main road prism and firewood is gathered by hand; therefore, within any given activity area *there are inconsequential direct, indirect or cumulative effects to the soil resource.*

There are no grazing allotments in the project area.

The proposed seed orchard in a section of Unit 134 would not use any heavy equipment that could displace or negatively impact soils beyond regional standards.

Future understory burns to maintain dry site stands would not use any soil impacting machinery.

No equipment such as pickups or skidders would be allowed off roads for other activities such as precommercial thinning or girdling trees infested with advanced mistletoe; therefore these activities would not have a cumulative effect.

The Bonners Ferry Salvage Sale EA, which was discussed in the 2004 SFEIS and 2005 Supplemental Draft EIS, has been cancelled. References and discussions of the potential cumulative effects from the proposed Salvage have been deleted from this SFEIS.

Private Land – Since all of the activity areas are located on National Forest Systems lands and are specific to the individual harvest units, there would be no cumulative effect within any activity area from private land activities.

d. ATV Trails

Unauthorized ATV trails are causing damage to wetlands north of Brush Lake. To minimize this activity, the proposed ATV trail network will be regulated and the trail locations will overlap with the old skid trail systems in proposed Units 1, 8, 11, 17 and 129 (see Chapter 2, section

2.7-B, Figures 2-3 and 2-4, and Chapter 3, section 3.9 for detailed information).

These existing skid trail systems do not impact any wetlands and are well suited for ATV use. Given that the proposed ATV trail system is overlaid on existing skid trails, additional detrimental cumulative effects to the soil resource will be negligible and well under the Region 1 Soil Quality Standards of 15%.

e. Soils Summary

In summary, there has been some detrimental soil compaction in the Mission Brush project area from past activity and there is also a possibility of increasing detrimental soil compaction, on a unit-by-unit basis, by 0 to 8%, given the Mission Brush EIS is implemented. Future entries will not exceed Region 1 soil quality standards because the equipment will stay mostly on existing trails. Given that Unit #16 has its surplus skid trails decompacted, none of the proposed Units will exceed the Region 1 standard of 15% detrimental compaction, now or following implementation of this project.

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4.3 Forest Vegetation – Mission Brush Project Area

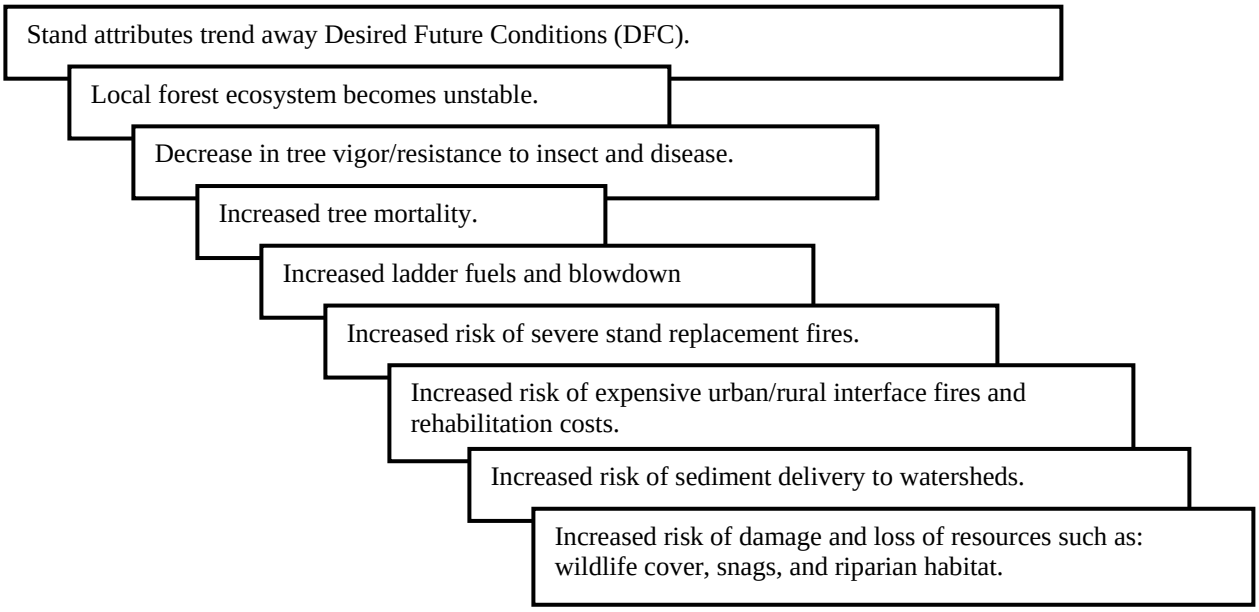
The SIMPPLLE model (Simulating Patterns and Processes at Landscape Scales) was used to help predict changes in vegetation through time. The model provides a modeling tool for managers to integrate and interpret concepts such as desired future conditions, range of variability, and the interaction between vegetation patterns and disturbance processes. SIMPPLLE offers an environment in which the knowledge developed by scientists and managers can be integrated into the quantification of potential vegetative conditions, disturbance process probabilities, and the logic for the interaction between processes and vegetation patterns. SIMPPLLE provides a way to help evaluate proposed management scenarios within a future that includes stochastic processes. Stochastic simulations with SIMPPLLE can help in designing management strategies by quantifying what processes may have a higher occurrence on the landscape, or what parts of the landscape are more prone to disturbance processes. Like any model, SIMPPLLE does have its limitations. To predict the probability of many processes requires knowledge of plant community vertical structure. This information can be difficult to obtain from some forms of inventory such as satellite imagery. However, the SIMPPLLE model simulations conducted by the District relied on TSMRS inventory data that was collected during field exams, not satellite imagery. The size of polygons can also have an influence on process behavior and since the model is polygon-based the entire polygon is affected when the model predicts a specific process. The initial validation work with the Coram Experimental Forest in Northwest Montana indicates that the approach used for capturing and integrating process knowledge in SIMPPLLE does predict realistic results at landscape scales (Chew, et. al. 2004).

4.3-A. Forest Composition

A.1- Alternative 1 - No Action

The following chart summarizes and displays the probable trends in the project area if restoration treatments were deferred.

Figure 4-1. Alternative 1 - General Forest Trends



The belief in a steady-state forest (one that doesn't change over time) has led scientists and others to assume that undisturbed forest structure or development pattern is natural and therefore conducive to sustaining biodiversity and sustainability. The steady-state model or paradigm of forest development has prevailed at different times in the thinking of foresters, conservationists, ecologists, and politicians for some parts of the past century. The paradigm has led to the management policy of stopping all fires, to the ecological theories of disturbances destroying a steady-state ecosystem, to the policies of reducing clear cuts and trying to stop stream siltation events, and to the political assumption that stopping all human activities in the forests would mitigate loss of endangered species (Johnson et al, 1994). The steady-state paradigm for forest ecosystems *has lost credit* among plant ecologists (Oliver and Larson 1990, Picket and White 1985, Stevens 1990).

a. Wildfire and Vegetation Trends:

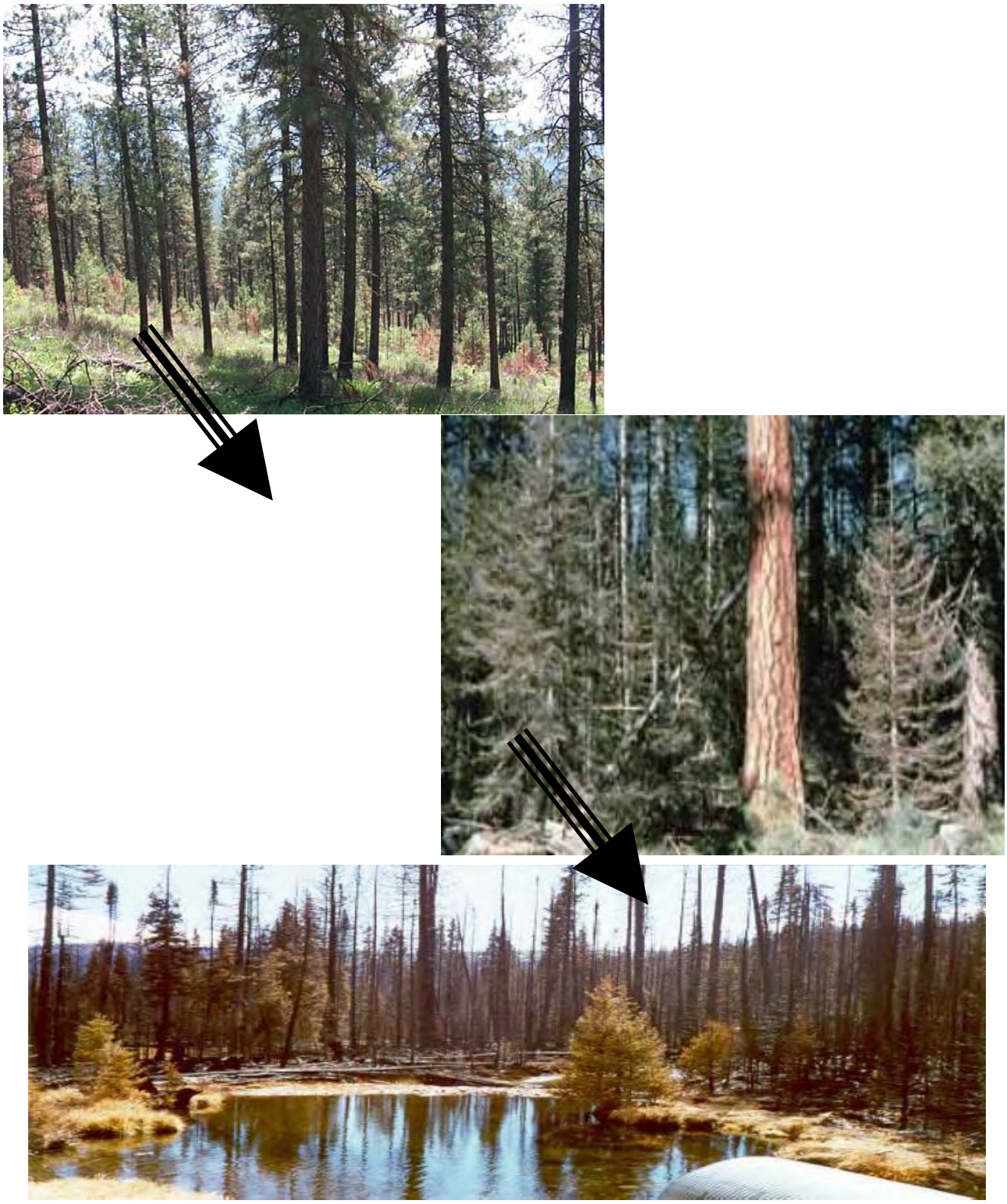
Under the No Action Alternative, it is assumed that fires would continue to occur within the project area. Furthermore, it is also assumed that these fires would continue to be actively suppressed. The State of Idaho Department of Lands and the Mt. Hall Volunteer Fire Department have the fire suppression responsibilities for the project area, including these rural interface areas. Allowing wildfires to burn without taking suppression actions is not an acceptable option in areas of human development.

As stated in Chapter 3, the fire interval in the project area has already been altered, with fires all but eliminated in the area since 1945. Since fire is the primary mechanism that controlled forest structure and composition, it is safe to assume that other components of the ecosystem have likewise been altered. Active fire suppression is an action that would continue disruption of the fire return interval and without silvicultural treatments, this disruption would further trend forest composition and structure away from historical conditions.

On drier sites, Douglas-fir would continue to dominate the understory layer, while larch and ponderosa pine would become displaced. Simply because Douglas-fir are more successful at regenerating in the absence of canopy openings created by fire or timber harvest. Given that these dry sites already have a limited supply of moisture and nutrients, stocking excessive number of trees on them further limits their productivity. Without fire to modify stand structures and compositions, insects and disease would act as the agents of control as these stands become overstocked and stressed with unnatural amounts of fuel build up.

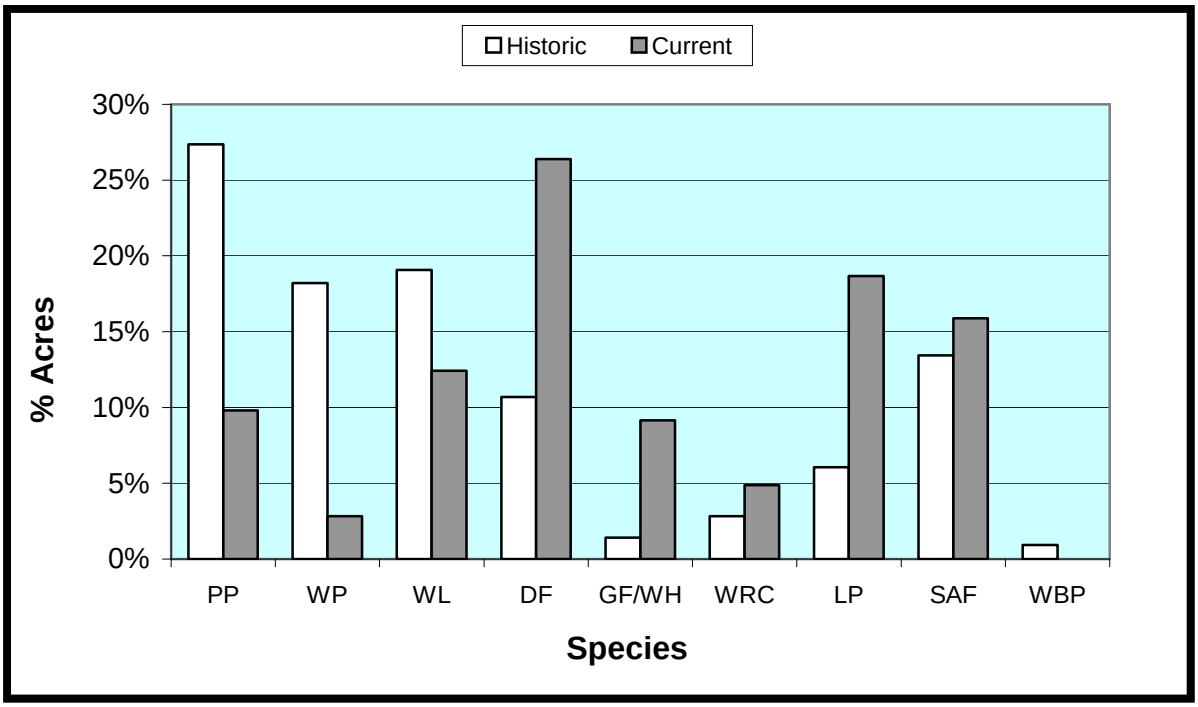
As a result, fires would burn with much more intensity than they did historically on these drier sites with much different outcomes. Old growth stands containing valuable "veteran" ponderosa pine that would have historically survived light intensity burns would likely be killed, and the risk of permanent site damage and alteration of species composition would increase. Figure 4-2 depicts changes in forest composition over time with no timber harvest or underburning.

Figure 4-2. Changes in Forest Composition Over Time with No Timber Harvest or Underburning



In the moist forest types, succession would continue toward the development of closed canopy stands of Douglas-fir, grand fir, western red cedar, and western hemlock. Western white pine would continue to succumb to blister rust. Western larch is a species that grows fast and lives long, but requires direct sunlight to establish itself. Without natural (fire or pathogen-caused) or human thinning, larch would drop out of most stands sometime in the future and not maintain the ecological role it had prior to Euro-American settlement and fire suppression (Zack 1995). Even-aged silviculture systems best fit the ecological requirements of larch and white pine forests (USDA 1990). Both species would fail to regenerate without forest openings and they would eventually become insignificant components of these stands. Figure 4-3 displays the estimated historic and current forest species composition in the project area.

Figure 4-3. Mission Brush Project Area Species Distribution from a Historical Perspective



b. Direct, Indirect and Cumulative Effects of Alternative 1

The direct effects of Alternative 1 would be a continued reduction in the percentage of long-lived seral species (ponderosa pine, western larch, and white pine) in the project area and an increase in the percentage of Douglas-fir and grand fir. With the continued overcrowding of Douglas-fir and grand fir, the competition for water and nutrients would increase, ultimately increasing the susceptibility of these forests to insect and disease outbreaks, lethal fires, and losses in productivity (Harvey et al 1994).

The direct, indirect and cumulative effects of Alternative 1 (No Action) would be:

- a continued trend away from sustainable ecosystem processes,
- a rising and more contiguous buildup of fuels across the project area,
- an increased risk of stand replacement fire(s),
- a continued increase in insect and disease mortality,
- increased fire suppression and rehabilitation costs,
- higher probability of damage to the rural interface lands, life and property.

A.2- Alternative 2

Silvicultural treatments would be used in conjunction with prescribed fire to begin trending stand structures and compositions toward sustainable historic levels on the Mission Brush landscape. The proposed unit sizes and locations are designed to mimic historic ecosystem processes such as the natural role of fire; which is and always will be one of

the most important processes in the Mission Brush ecosystem. Acreage figures for the proposed Units can be found in Chapter 2. A primary goal of restoration treatments is to create more open stand structures, thereby improving tree vigor and reducing vulnerability to insects, disease, and severe fire. An additional goal is to manipulate existing species composition and site conditions to favor regeneration of ponderosa pine, larch and white pine.

Where they currently exist in the overstory, the most vigorous ponderosa pine, white pine, and larch would be maintained in treated stands. Where regeneration harvests are prescribed, these species would be restored through planting and natural regeneration. Restoring these species in the Mission Brush project area would begin to improve overall ecosystem processes by replacing overcrowded stands of Douglas-fir, grand fir, western hemlock, cedar, and lodgepole pine with open-grown stands of ponderosa pine, white pine, and western larch. The new stands would be more resistant to fire, insects, and disease problems than the species they would be replacing. Planting of blister rust resistant stock is needed to obtain substantial white pine regeneration, which was dominant in many stands prior to the advent of white pine blister rust (Byler et al, 1994). A primary advantage of cutting is that it allows for the controlled removal of specific trees in terms of number, size, species, and location (Fiedler 1996).

Alternative 2 would trend about 2300 acres (10% of the project area) of ponderosa pine type forest toward sustainable stand attributes. Approximately 1500 acres (7% of the project area) of white pine and larch forests would be trended toward better overall stand health. Less than 500 acres (2% of the project area) are located in the cool and moderately dry habitats.

a. Direct, Indirect and Cumulative Effects of Alternative 2

In regards to the issues and indicators listed in Chapter 2, the direct, indirect, and cumulative effects of Alternative 2 are numerous. Restoring and trending the vegetation structure and composition toward historic values would cause the endemic ecosystem processes tend to follow suit. For instance, in the treated stands, the overcrowded, fire prone, unhealthy conditions would be alleviated, and the stand attributes such as trees per acre and species composition of the forest stands would be trended back toward a more resilient condition.

- In the long term, there would be an increase in the percentage of self sustaining stands composed of long-lived seral species such as ponderosa pine, western larch, and white pine across the project area, and a decrease in the percentage of surplus, short-lived, species like lodgepole pine, Douglas-fir and grand fir.

- Fuels reduction treatments such as underburning, piling, and ecosystem burns, (repeated as necessary when fuels accumulate again) will begin to restore the role of fire back in to the Mission Brush ecosystem. This is an important factor to maintaining and improving the quality and function of the dry site old growth ponderosa pine stands across the project area.

A.3- Alternative 3

Alternative 3 would trend about 1750 acres (8% of the project area) of ponderosa pine type forest toward the DFC. Approximately 1120 acres (5% of the project area) of white pine and larch forests would be trended toward their respective DFC. Less than 360 acres (2% of the project area) are located in the cool and moderately dry habitats.

a. Direct, Indirect, and Cumulative Effects of Alternative 3

The effects are similar to Alternative 2; the main difference is in the number of acres treated.
The overall effect to the ecosystem would be:

- a continued trend in the forest composition toward the DFC, and sustainable ecosystem processes,
- a decrease in insect and disease mortality, a decrease in the fuel loading and continuity of fuels across the project area,
- a decreased risk of stand replacement fire(s), decreased risk of large scale fire suppression and rehabilitation costs.

A.4- Alternative 4

Alternative 4 would trend about 2300 acres (10% of the project area) of ponderosa pine type forest toward more sustainable conditions. Approximately 950 acres (4% of the project area) of white pine and larch forests would be trended toward more sustainable conditions. Less than 10 acres are located in the cool and moderately dry habitats of the project area.

a. Direct, Indirect, and Cumulative Effects of Alternative 4

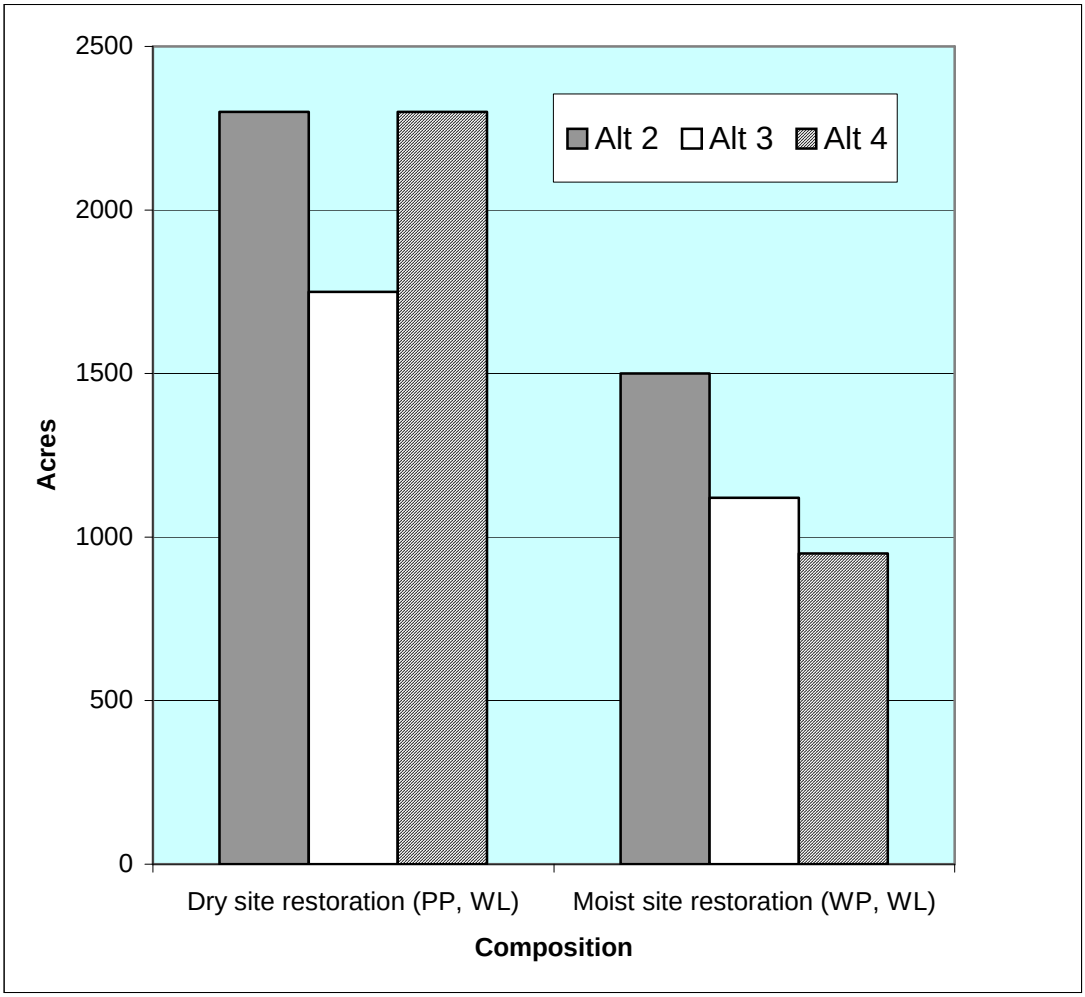
The overall effect to the ecosystem would be:

- a continued trend in the forest composition toward sustainable ecosystem processes,
- a decrease in the fuel loading and continuity of fuels across the project area,
- a decrease in insect and disease mortality,
- a decreased risk of stand replacement fire(s),
- decreased risk of large scale fire suppression and rehabilitation costs,
- a lower probability of damage to the rural interface lands, life and property

A.5- All Action Alternatives

The changes in forest composition for each action alternative are displayed in the following chart.

Figure 4-4. Acres of Forest Composition Trended toward sustainable conditions through Restoration Treatments



4.3-B. Forest Structure

B.1- Alternative 1

Changes in forest structure are subtle until they are looked at over a longer period of time. Currently, multi-storied forests dominate the landscape. Using the SIMPPLLE model, changes in forest structure were projected for each alternative over a 50-year period that included natural disturbances (Figure 4-5). The model was run assuming attempts to suppress all fires would continue. However, the model assumes a probability that some suppression efforts would be unsuccessful and a certain amount of natural fire(s) would occur.

Under Alternative 1, natural succession, along with root disease and fire are projected to be the dominant processes that shape forest structures. The projected extent of root disease is not surprising given the amount of Douglas-fir that currently dominates the landscape. Multi-layered stands of pole-immature sized Douglas-fir are projected to be the dominant forest structure. Ponderosa pine, western larch, and white pine are projected to be decreasing components of the landscape.

The model also projects the amount of old growth to drop from the current level of 11% to an estimated 3% at the end of the 50-year scenario. This predicted loss of old growth structure is primarily due to two factors: 1) stand replacing fire and 2) root disease. The predicted changes from fire are more obvious (i.e., the stand burns) than those created by changes from root disease. In the drier forest types, existing old growth ponderosa pine and larch would eventually succumb to from excessive Douglas-fir competition, removing the primary component of dry forest old growth. Given the dominance of Douglas-fir, root diseases would increase over time. Although canopy openings would be created, only Douglas fir, which is more tolerant of shade, would regenerate. Even if some ponderosa pine and larch survive, these species would fail to regenerate given their requirements for open sunlight and exposed mineral soil (Schmidt and Shearer 1990; Oliver and Ryker 1990). Consequently, a cycle of Douglas-fir dominance and root disease would be perpetuated, and stands of open-grown old growth ponderosa pine and larch would gradually be eliminated.

Under the No Action alternative, major changes in forest structure are projected over time (Figure 4-6). The biggest changes are expected to occur in old and mature forests, and younger open forests. Although the SIMPPLLE model estimates the amount of open forest (73%) to be above the historic range (15-50%), the estimated amount of openings would not be totally unlike turn of the century conditions when extensive stand-replacing fire events burned nearly 50% of the project area (Behrens 2002). *The fact that the model projects significant landscape changes due to stand-replacing fire is the important point, not the exact amount the model predicts*.

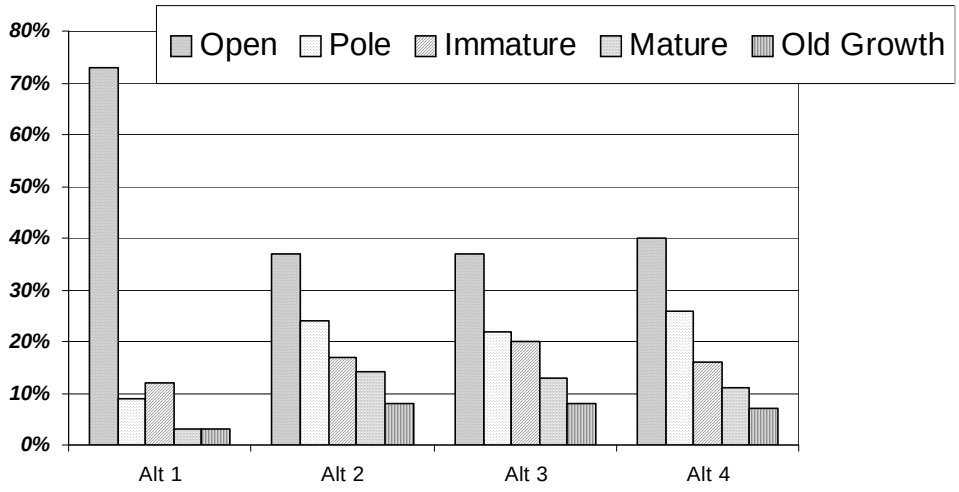
Changes in forest structure under Alternative 1, projected with SIMPPLLE, are summarized as follows:
- Older growth and mature forests would decrease from 31% to 6%
- Younger forest structures (openings and pole timber) would increase from 28% to 82%.

For the following chart changes in forest structure were projected for each alternative over a 50-year period and included likely natural disturbances.

a. Direct, Indirect & Cumulative Effects – Alternative 1

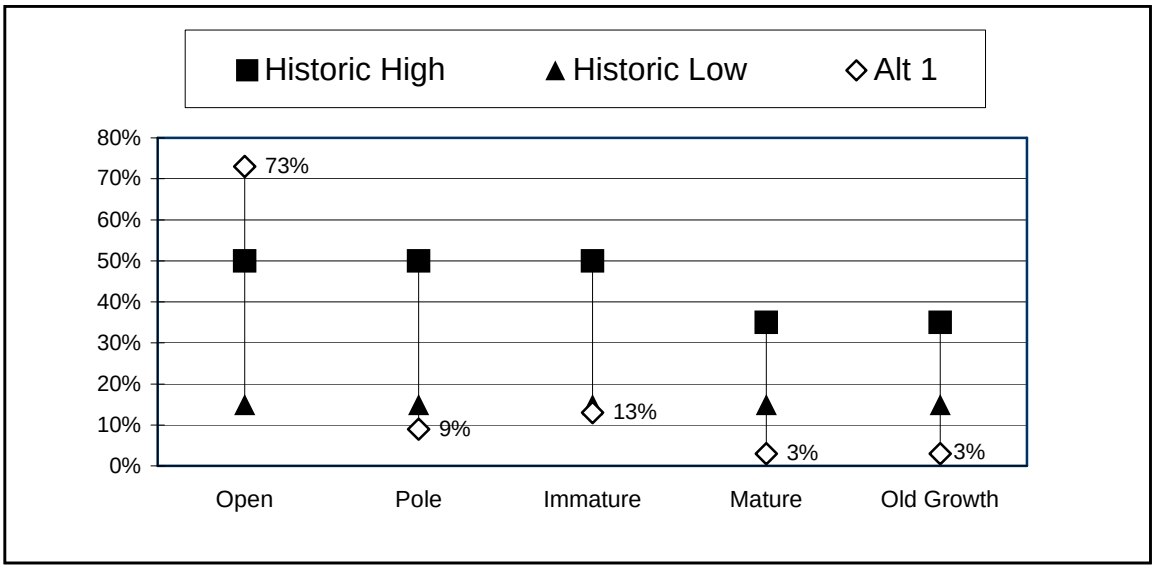
The direct effects would be maintenance of the dominance of multi-storied forest structures across the landscape. Indirect and cumulative effects would be an increased long-term risk of insect and disease occurrences and stand-replacing fire, especially on dry site forest types.

Figure 4-5. Projected Size Class Distribution with Natural Disturbances - Alternatives 1, 2, 3, and 4



The following chart displays the range of the historic structure (high and low values) compared with the 50-year projection by SIMPPLLE analysis of Alternative 1 – No Action.

Figure 4-6. Mission Brush Forest Structure – Historic and Projected (Alternative 1)



B.2- Alternative 2

Silvicultural treatments would be used in conjunction with prescribed fire to begin trending stand structures and compositions of ponderosa pine, white pine, and western larch toward sustainable historic levels on the Mission Brush landscape. A primary goal of the restoration treatments in ponderosa pine and fir forests is to create more open stand structures, thereby improving tree vigor and reducing vulnerability to insects, disease, and severe fire. An additional goal is to manipulate existing species composition and site conditions to favor regeneration of ponderosa pine, larch and other seral species. The proposed unit sizes and locations are described in Chapter 2.

Changes in forest structure under Alternative 2 as projected with SIMPPLLE are summarized here and displayed in Figures 4-5 and 4-7:

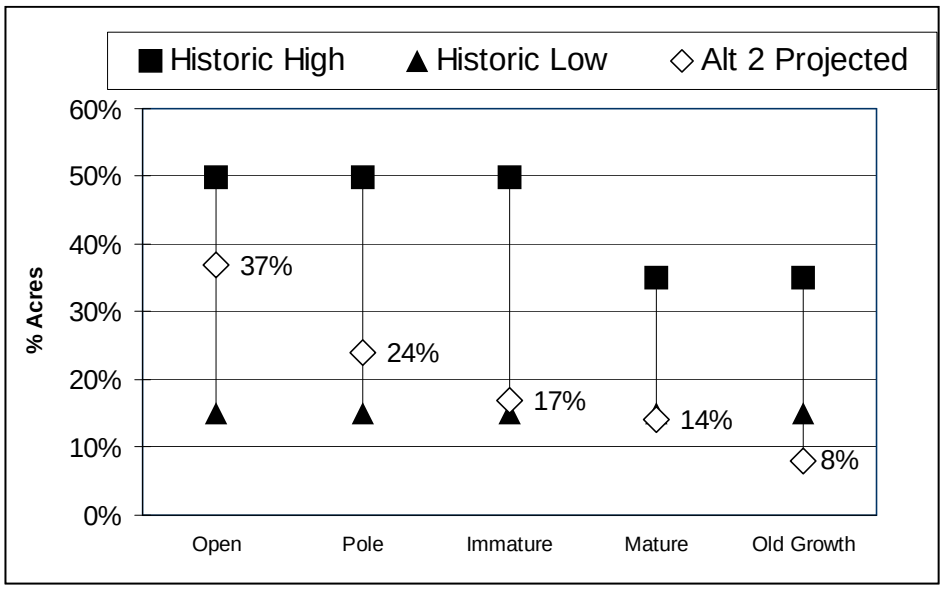
- Older growth and mature forests would decrease from 31% to 22%
- Younger forest structures (openings and pole timber) would increase from 28% to 61%

a. Direct, Indirect and Cumulative Effects – Alternative 2

The direct, indirect, and cumulative effects of Alternative 2 would be to improve forest structure, composition and stand sustainability in the long term. The direct effects of Alternative 2 would be to increase the percentage of more open forest structures within the project area. Changes in stand structure from the prescribed treatments would alter the potential fire behavior in all treated stands from generally stand-replacing, lethal fires to low severity fire events. In particular, a stand replacing fire in the dry forest types would kill not only the smaller trees, but some of the old growth pine, Douglas-fir and larch as well. In comparison, a low severity fire would burn rapidly across the forest floor for a shorter period of time, but not into the crowns of the trees. In addition, promoting the development of more open grown stands of white pine and larch would reduce the risk of high severity fires in these moister forest types as well.

Consequently, the indirect and cumulative effects of Alternative 2 would be to reduce the short-term risk of stand-replacing fire, as well as insect and disease occurrences across the landscape, especially on dry site forest types. However, as implied with the SIMPPLLE model, over a 50-year period stand-replacing fires would continue to alter forest structures without a long-term commitment to fuels reduction across the landscape.

Figure 4-7. Historic vs. Projected Forest Structure (Alternative 2)



B.3- Alternative 3

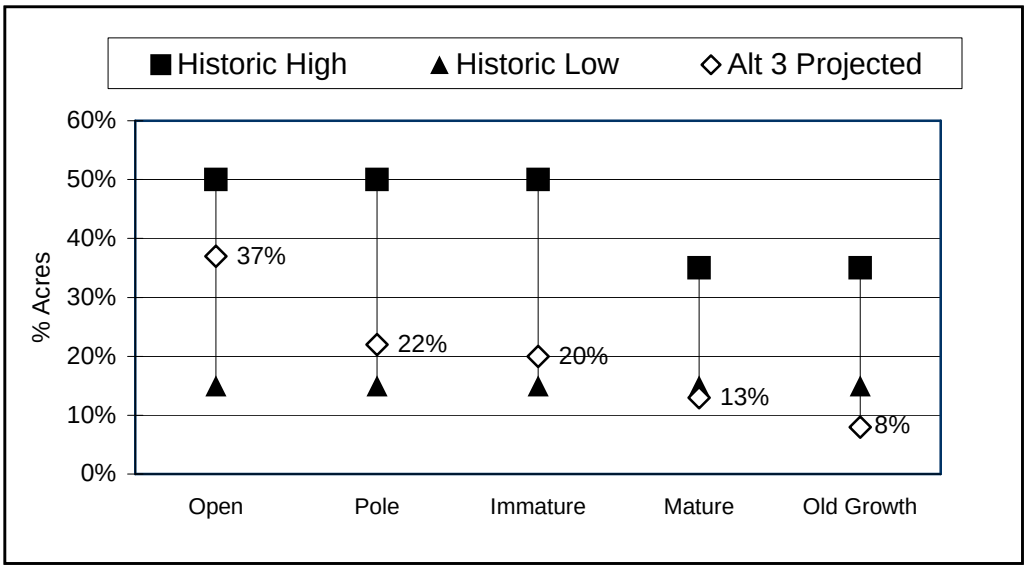
a. Direct, Indirect and Cumulative Effects – Alternative 3

The direct, indirect and cumulative effects of Alternative 3 are very similar to those described in Alternative 2; the main difference is in the acres of restoration treatments.

Changes in forest structure under Alternative 3 as projected with SIMPPLLE are summarized here and in Figures 4-5 and 4-8:

- Older growth and mature forests would decrease from 31% to 21%
- Younger forest structures (openings and pole timber) would increase from 28% to 59%

Figure 4-8. Historic vs. Projected Forest Structure (Alternative 3)



B.4- Alternative 4

a. Direct, Indirect and Cumulative Effects

The direct, indirect and cumulative effects of Alternative 4 are very similar to those described in Alternative 2; the main difference is that Alternative 4 does NOT propose restoration treatments in those units listed in the following table. The units are located in the northern end of the project area and represent the opportunity to restore approximately 1000 acres of moist site stands towards the forest structures composed of larch and white pine that existed historically.

Table 4-1. Treatment Areas in Alternative 2 that are Not included in Alternative 4

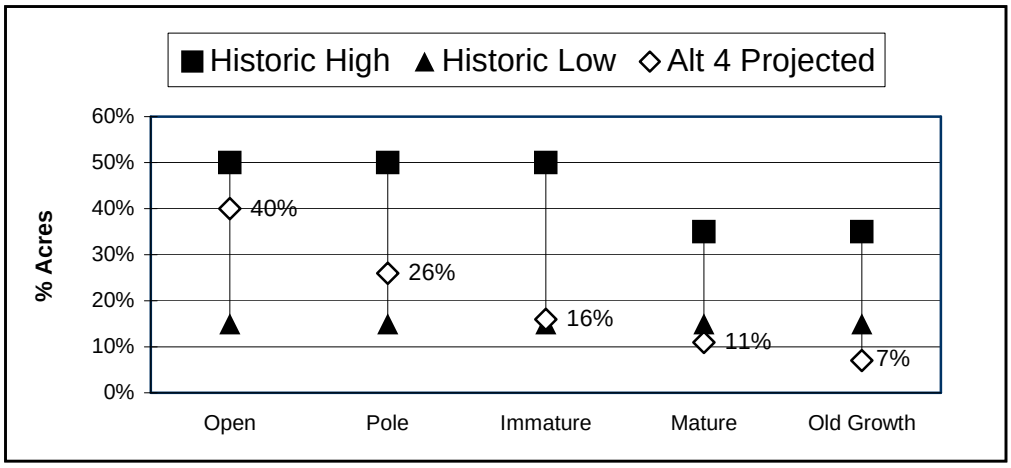
Unit	Acres
33	125
38	132
41	75
44	20
57	39
58	48
61	87
63	35
66	52
69	46
111	51
112	30
125	123
134	86
135	39
TOTAL	**988**

(Acres shown are approximate.)

Changes in forest structure under Alternative 4 as projected with SIMPPLLE are summarized here and in Figures 4-5 (above) and 4-9 (below):

- Older growth and mature forests would decrease from 31% to 18%
- Younger forest structures (openings and pole timber) would increase from 28% to 66%

Figure 4-9. Historic vs. Projected Forest Structure (Alternative 4)



4.3-C. Forest Openings

The proposed openings that would exceed 40 acres (and their estimated effects) have been incorporated into the aquatics, wildlife, fire, and visual analysis design. The Bonners Ferry Ranger District is proposing these openings because they are an integral part to ecosystem restoration in the project area. Treatments that would result in openings exceeding 40-acres in size are needed to address the following resource concerns:

Issues Directly Related to Forest Vegetation

- *Insects and Diseases* – Concerns are related primarily to bark beetles, root diseases, and dysgenic pollen and seed from non-adapted seed sources (off-site ponderosa pine).
- *Risk of Stand-Replacing Fire on Dry Forest Types* – The risk of stand-replacing fire is a specific concern in dry forest types where fire suppression has caused changes in forest composition and structure. These forests are at risk of losing key components in the event of a stand-replacing fire.

Issues NOT Directly Related to Forest Vegetation

- *Visuals* – Treating areas adjacent to previous regeneration harvest blocks would modify the existing visual appearance. The openings larger than 40 acres that would meet visual quality objectives (project file - Visuals Report).
- *Canada Lynx* –All action alternatives include harvest units larger than 40 acres, which is consistent with timber management conservation measures in the Lynx Conservation Assessment and Strategy (USDA-USDI 2000), which states, "vegetation treatments should be designed to approximate historical landscape patterns and disturbance processes."

The following discussions disclose the number and size of openings larger than 40 acres for each alternative and how these larger openings would change the average opening size.

a. Direct, Indirect & Cumulative Effects – Alternative 1

- The effects of not creating openings are similar to those described previously concerning the issues of forest composition, forest structure, and historic opening sizes. As mentioned in Chapter 3, openings are necessary for seral species regeneration and diversity of species across the landscape.
- The current average opening size is estimated at 34 acres versus the historic estimate of 690 acres (Behrens 2004), which represents a decrease in opening size of nearly twenty times.

b. Alternative 2

- Openings greater than 40-acres would blend into the existing openings, either natural, or those created through past timber harvest. These openings would more closely resemble those created historically by fires.
- The average opening size would increase from 34 to 61 acres, which represents an increase of nearly 80%.
- Limiting treatment units to 40 acres or less would not effectively address the long-term vegetation needs in the project area.

A list of the openings greater than 40 acres for Alternative 2 is provided in the following table.

Table 4-2. Openings Greater Than 40 Acres (Alternative 2)

Unit(s)	Unit Acres subtotal	Existing Opening Acres subtotal	Total Opening Acres
6, 7, 9	215	24 (Brush Lake)	239
19	67	--	67
33	125	--	125
38	132	21	153
41	75	40	115
57, 58, 60, 61, 63, 66, 69	440	--	440
111, 112	80	16, 24, 40	160
125	123	12, 18, 34	187
134	86	28, 33	147
140	128	--	128

(Acres are approximate)

c. Alternative 3

- Openings greater than 40 acres would blend into the existing openings, either natural, or those created through past timber harvest. These openings would more closely resemble those created historically through historic fires.
- The average opening size would increase from 34 to 57 acres, which represents an increase of about 67%.

A list of the openings greater than 40 acres for Alternative 3 is provided in the following table.

Table 4-3. Openings Greater Than 40 Acres (Alternative 3)

Unit(s)	Unit Acres subtotal	Existing Opening Acres subtotal	Total Opening Acres
6, 7, 9	215	24 (Brush Lake)	239
33	125	--	125
38	132	21	153
57, 58, 60, 61, 63, 66, 69	440	--	440
111, 112	80	16, 24, 40	160
125	123	12, 18, 34	187
134	86	28, 33	147

d. Alternative 4

- Openings greater than 40 acres would blend into the existing openings, either natural, or those created through past timber harvest. These openings would more closely resemble those created historically through historic fires.
- The average opening size would increase from 34 to 41 acres, which represents an increase of about 20%.

A list of the openings greater than 40 acres for Alternative 4 is provided in the following table.

Table 4-4. Openings Greater Than 40 Acres (Alternative 4)

Unit(s)	Unit Acres subtotal	Existing Opening Acres subtotal	Total Opening Acres
6, 7, 9	215	24 (Brush Lake)	239
19	67	--	67
60,	133	--	133
140	128	--	128

4.3-D. Risk of Stand-Replacing Fire in Dry Forest Types

The risk of stand-replacing in dry forest types, compared to Alternative 1 (No Action), was calculated for Alternatives 2, 3 and 4. Using the SIMPPLLE model the probability of stand-replacing fire was projected for proposed treatment units and their neighboring stands. The model calculates a probability of stand-replacing fire based on a number of factors including, but not limited to, existing stand conditions (species, structure, composition, etc.), insect and disease occurrences, and overall probability of fire occurrence in a given area.

The SIMPPLLE model works in a stochastic nature, which means processes that affect an individual stand may affect adjacent stands, depending on the condition of the adjacent stands. For example, if a fire starts in a given stand and a neighboring stand is fairly open, the fire may burn as a low-severity fire. However, if the neighboring stand is a dense, multistoried stand with root disease, the fire may burn as a stand-replacing event. Consequently, the model is sensitive to changes in forest composition and structure at the landscape level. Morgan et al. (1994), stated that when ecosystems are outside their historical range of variability, changes may occur dramatically and rapidly. An investment of money, energy, or human effort may be required to counter processes that would change the desired state of the ecosystem. In other words, ecosystems outside their historical range would be much more susceptible to catastrophic changes from fires and insects and diseases. Consequently, the cumulative effects of no action in these dry forest types would result in fires that are more costly and difficult to manage when ecosystem structure and composition are outside their historical range.

D.1- Alternative 1

By counting fire scars on relic trees in the project area, the fire return interval in dry forest types was determined to be within the range of 15 to 35 years. Smith and Fischer (1997) state that, as the fire return interval in these forest types increases, the likelihood of a severe stand-replacing event also increases.

Currently, there is no "Wild Land Fire Used For Resource Benefits" policy for the Mission Brush area. Therefore, active fire suppression is expected to continue in the area, which would further extend the fire return interval. Continued fire suppression with no silvicultural treatments would trend vegetation patterns away from historical conditions; therefore increasing the risk of stand-replacing fire.

- It is important to note from a fire effects standpoint, that it does not take a crown fire to kill the large old growth ponderosa pine. The annual buildup of bark scales and needles form a thick mat of fuel just above the root crown of the tree. Even a creeping surface fire will ignite this layer of fuel. If the fire occurs in the late summer when the soils are dry, the fire can burn down to the root zone where the heat can kill or severely damage the tree roots. The only way to avoid “lethal” amounts of fuels build up is to rake away the needles and bark scales from the base of the trees or underburn the stands on a regular basis (i.e. 10 –15 years) and confine the burn

timing to the spring when the soils are moist. Regular underburning would also create fire scars on the trees, saturate the base of the trees with resin, and in the long term create rot resistant future snags for wildlife.

Morgan et al. (1994), stated that when ecosystems are outside their historical range of variability, changes may occur dramatically and rapidly (Figure 4-10). An investment of money, energy, or human effort may be required to counter processes that would change the desired state of the ecosystem. In other words, ecosystems outside their historical range would be much more susceptible to catastrophic changes from fires and insects and diseases. Consequently, the cumulative effects of no action in these dry forest types would result in fires that are more costly and difficult to manage when ecosystem structure and composition are outside their historical range. Given these circumstances, the current risk of stand-replacing fire is expected to increase over time compared to the action alternatives.

Figure 4-10. Erosion Following a Wildfire

This photo shows one example of erosion following a wildfire.

The current danger to these forests is not only stand replacing wildfire, but wildfire burning through fuel accumulations so high that resulting burns would be extremely hot, resulting in critical reductions of stored nutrients through volatilization, with accompanying losses to potential productivity and the threat to adjacent private land, life and property. (Harvey et al. 1993).

D.2- Alternative 2

Under Alternative 2, the SIMPPLLE model estimates that the probability of stand-replacing fire in the dry forest types within the project area would be reduced by 20%, and by more than 50% within the treated stands. Given the nature of the proposed dry forest treatments, this is not surprising. These treatments would trend forest structures toward more open conditions featuring old growth fire resistant trees, which would resemble historic conditions when low-severity fires were the primary fire regime.

D.3- Alternatives 3 and 4

Under Alternatives 3 and 4, the SIMPPLLE model estimates that the probability of stand-replacing fire in the dry forest types within the project area would be reduced by 15%, and by about 40% within the treated stands. Both alternatives treat fewer acres of dry forest types than Alternative 2; Alternative 3 treats about 450 fewer acres and Alternative 4 treats

about 300 fewer acres. Additionally, both alternatives treat over 300 fewer acres of dry with regeneration harvests. This explains why Alternatives 3 and 4 are less effective at reducing the risk of stand-replacing fire on dry forest types.

D.4- All Action Alternatives

Based on estimates from the SIMPPLLE model, all action alternatives reduce the risk of stand-replacing fire on dry forest types, albeit by varying degrees. Additionally, all of the action alternatives would reduce the risk of stand-replacing fire across the *entire* landscape, not just dry forest types. Alternative 2 reduces the risk of stand-replacing fire across the landscape by an estimated 20%, while Alternatives 3 and 4 reduce the risk by slightly less than 10%. The results of the SIMPPLLE model, which includes varying amounts of 40-acre openings per alternative, indicate that treating large landscapes can reduce the risk of stand-replacing fire. The results of the model are consistent with findings of Graham et al (2004) and Graham (2003). Large patch sizes that exceed 40 acres are required in order to meet landscape pattern design that reduces the probability of severe fire behavior.

Protecting large landscapes requires land managers to develop large-scale fuel treatment patterns that more effectively reduce the potential for catastrophic fire and promote healthier forest conditions than would small treatment patterns. In studying the effects of the Hayman Fire (Graham, et. al. 2004) it was determined that larger treatment areas were more effective than small fuel breaks in changing fire behavior. They also determined that few fuel treatments had been performed in the area recently, leaving most of the landscape within the fire perimeter with no treatment, or older treatments. The area had a high degree of continuous fuels in age and patch structure, which facilitates fire growth. Isolated treatment units have limited effectiveness under these conditions. Graham (2003) also points out given the current fuel accumulations across the interior West, small treatment areas will probably be irrelevant to fire behavior.

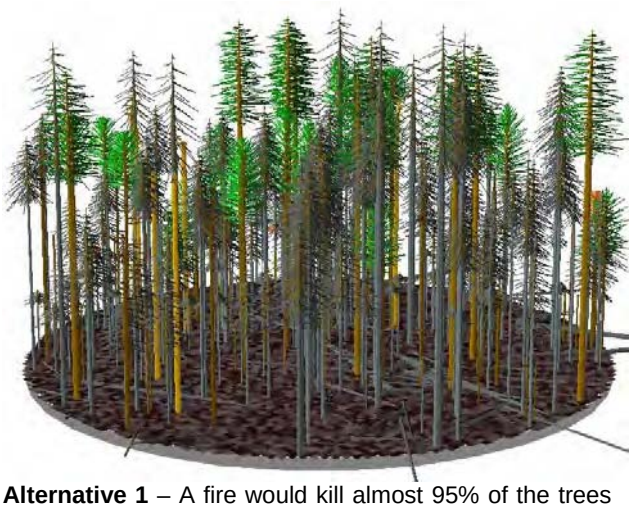
Given that Alternative 2 includes nearly 900 acres more regeneration harvesting than Alternative 3 and 1,450 acres more than Alternative 4, this may explain why the SIMPPLLE model estimates that Alternative 2, which involves large-scale fuel treatment patterns, provides a greater reduction in the risk of stand-replacing fire than the other two action alternatives.

Using the Forest Vegetation Simulator (FVS), a typical dry forest stand was projected 35 years into the future for each alternative and simulated fire was projected to burn through the stand at the end of 35 years. To provide consistency, the simulated wildfire was run under the same weather (normal summer) and fuel moisture conditions for each alternative.

The figures on the next two pages provide illustrations and summaries of how a typical dry forest stand could look following such a fire, and a cause and effect flow chart for regeneration harvesting.

Figure 4-11. Dry Forest Stand Conditions Following Wildfire in 35 Years

Existing conditions – Illustration of a typical dry forest stand in the Mission Brush project where large-diameter ponderosa pine are being replaced by small-diameter Douglas-fir.



Alternative 1 – A fire would kill almost 95% of the trees in this type of stand and over 70% of the trees greater than 20 inches in diameter.

Alternatives 2, 3, and 4 – Harvesting the small-diameter trees and retaining the larger ponderosa pine, larch and Douglas-fir, would drastically alter potential fire behavior. Compare the above example with the Existing Condition example. A fire in the above stand would kill most of the small trees (less than 5” diameter), but less than 10% of the trees over 20" in diameter

Figure 4-12. Cause And Effect Flow Chart For Regeneration Harvesting

CAUSE

Regeneration harvest and periodic underburning

EFFECTS

Understory burn converts slash into available nutrients.

Fuel loading reduced. Stand replacement fire risk lowered.

Overstory trees have less tree- to-tree competition. Increased growth and vigor. Higher resilience to insect and disease attacks.

Openings in forest canopy allow sunlight into the understory; permitting regeneration of larch, ponderosa pine and white pine.

Repeat under burning as needed every 10 to 25 years to maintain and trend the species composition and structure towards more sustainable conditions.

EFFECTS

Understory trees (grand fir, Douglas-fir) consumed in the underburn.

Single story park-like stand created.

Opening up the stand allows wind penetration. Isolated pockets of blowdown possible.

Incidental overstory tree mortality from underburning activities. Snags for wildlife created.

4.3-E. Insects and Diseases

Disease agents (pathogens) and insects affect forests in various ways (Haack and Byler 1993). They are essential to the function of dynamic ecosystems: they serve to thin out some trees, recycle nutrients, create habitat and provide food to many wildlife species. They can also negatively affect resource values and ecosystem function (USFS 1999).

E.1- Direct, Indirect & Cumulative Effects

a. Alternative 1

The direct effects would be maintenance of the dominance of multi-storied forest structures across the landscape. Indirect and cumulative effects would be an increased long-term risk of insect and disease occurrences and stand-replacing fires, especially on dry site forest types.

b. All Action Alternatives (2, 3, and 4)

Root disease and bark beetle related mortality are widespread across the project area. Over 2,500 acres of timber stands are at a high to moderate risk of mortality from bark beetles (project file). Treating areas larger than 40 acres is necessary to address the magnitude of the "acres at risk" or stands with moderate to high root disease and bark beetle ratings.

Given the high percentage of stands dominated by Douglas-fir and grand fir, which are susceptible to root diseases, and the combined effects of bark beetle hazards throughout the project area, openings smaller than 40 acres would not address the magnitude of forest health concerns in these stands. Consequently, all of the action alternatives propose openings larger than 40 acres. All of the action alternatives would treat 467 acres of off-site ponderosa pine stands. Units 6, 7, and 9 (215 acres) are almost pure off-site ponderosa pine, while units 8 and 13 (252 acres) have off-site ponderosa pine scattered throughout. Designing these units to include genetically non-adapted ponderosa pine will capture the current mortality, and remove the dysgenic seed sources. Once again, openings smaller than 40 acres would not address the magnitude of these "off-site" stands.

Beetle 'Epidemic' Rends Northwest Forests
By The Associated Press. March 2006

COEUR D'ALENE, Idaho (AP) -- The region's largest infestation of mountain pine beetles in 20 years has hit more than a million acres of forests in northern Idaho and Montana, while 2.5 million acres in Washington face disease and insect problems.

Recent flight surveys by the U.S. Forest Service and state forest management agencies found that years of drought have left forests in the Northwest vulnerable.

The surveys found that 1.1 million acres of forest came under attack by mountain pine beetle in northern Idaho and Montana in 2005, an increase from the 675,000 acres the year before.

The Washington Department of Natural Resources reported that mountain pine beetles were at "epidemic" levels, with a 28 percent increase to 554,000 acres. Overall, insect and disease problems are present in 2.5 million of Washington's 21 million acres of forest, up from 1.9 million acres the previous year.

Karen Ripley, an entomologist with the Washington Department of Natural Resources, said last year's abundant rain and this winter's good snowpack will reduce the stress on the region's forests.

But she said it would take several years of normal moisture for forests to return to health. She said fire suppression combined with a lack of logging means nature will find a way to remove trees.

"Nature's way is to have some of the beetles kill some of the trees," Ripley told the Spokesman-Review. "That relieves some of the competition. We've got a lot of stressed trees out there now, and they're easy pickings."

Black (2005) provides some general guidelines when considering pest insects and forest management including:

- maintenance and restoration of high-quality late successional and old growth forest conditions
- ensuring structural and species diversity when logging, including retention of large diameter trees and snags, downed wood, and canopy closure
- minimize soil compaction when thinning or logging
- utilize prescribed fire to promote more natural forest conditions
- reduce current road densities, particularly in ecologically significant areas

Each of the action alternatives addresses these guidelines to some degree.

All of the alternatives would maintain existing old growth allocations in the project area and include some level of restoration of dry forest old growth. Arno and Fiedler (2005) state that old trees need relatively open conditions to maintain modest growth rates and survive several hundred years. Low-vigor trees are unable to marshal enough resources to maintain adequate defense. Large trees growing in a dense layer of smaller trees are especially vulnerable to attack, underscoring the importance

of maintaining reasonable growth rates. Results three years later of treatments in old growth ponderosa pine and larch stands on the Lolo NF showed old growth trees had increased sap flow, higher foliar nitrogen content, and higher foliage production (Sala and Calloway 2001), indicating improve tree vigor and increase resistance to insects and disease. Stone et al (1999) also found that restoration of pre-Euro-American stand structure by thinning improved vigor of ancient, pre-settlement ponderosa pines in northern Arizona. Increased canopy growth and increased uptake of water, nitrogen, and carbon indicated improved tree vigor. They concluded in their study that the negative influence of post-settlement trees on pre-settlement trees likely resulted from competition for soil resources. Their conclusion agreed with correlative studies conducted at their study site by Sutherland (1983) and Biondi (1996). Furthermore, as discussed later in Chapter 4 (page 4-33) the trend on the District and the project area is to grow more old growth and mature forests.

Overall, as discussed in Chapter 2 (Tables 2-5, 2-6 and 2-7) the silvicultural prescriptions are designed to favor development of large-diameter trees, especially long-lived seral species (e.g., western larch, ponderosa pine, and white pine). These prescriptions would reduce the abundance of shade-tolerant species, which are more vulnerable to insects (Langston 1995). Where regeneration harvests are prescribed (both even-aged and uneven-aged) the objective would be to improve species composition through reforestation of long-lived seral species. As discussed in Chapter 3 (Figures 3-21 and 3-22) the relative abundance of these species, compared to estimated historic levels, has decreased considerably, while shade-tolerant species (e.g., Douglas-fir, grand fir, western hemlock, and subalpine fir) have increased.

Additionally, where harvest prescriptions are applied, required design criteria in Chapter 2 would help ensure recommended levels of coarse woody debris (Chapter 2 section 2.8 Items included in Timber Sale and Road Construction Contracts, item A.2-d) and snags (Chapter 2 section 2.8 Items not included in Timber Sale and Road Construction Contracts, item A.4 – Wildlife Habitat Features) are retained and IPNF soil standards (Chapter 2 section 2.8 Items included in Timber Sale and Road Construction Contracts, item A.1-j and Chapter 2 section 2.8 Items not included in Timber Sale and Road Construction Contracts, items A.2-d and A.3-4) are attained. Various levels of prescribed burning are included in each alternative (Chapter 2, Table 2-13) that would help restore ecosystem processes that occurred historically in the project area. Finally, total road densities would be reduced through decommissioning and road storage under each alternative (Chapter 2, Table 2-13).

c. Alternative 2

Alternative 2 would treat an estimated 260 acres that are rated either moderate or high hazard for mountain pine beetle (Randall and Tensmeyer 2000) and another 610 acres that are rated moderate or high hazard for Douglas-fir beetle (Randall and Tensmeyer 1999). An estimated 200 acres of mountain pine beetle hazard stands and another 215 acres of Douglas-fir beetle hazard stands would be treated with units larger than 40 acres, thus capturing the risk of disease infection and insect infestation described in Tables 2-1 and 2-16.

d. Alternative 3

Alternative 3 would treat an estimated 190 acres that are rated either moderate or high hazard for mountain pine beetle (Randall and Tensmeyer 2000) and another 530 acres that are rated moderate or high hazard for Douglas-fir beetle (Randall and Tensmeyer 1999). An estimated 150 acres of mountain pine beetle hazard stands and another 190 acres of Douglas-fir beetle hazard stands would be treated with units larger than 40 acres.

e. Alternative 4

Alternative 4 would treat an estimated 60 acres that are rated either moderate or high hazard for mountain pine beetle (Randall and Tensmeyer 2000) and another 500 acres that are rated moderate or high hazard for Douglas-fir beetle (Randall and Tensmeyer 1999). An estimated 35 acres of mountain pine beetle hazard stands and another 110 acres of Douglas-fir beetle hazard stands would be treated with units larger than 40 acres.

4.3-F. Air Quality

F.1- Conducting Burns and Monitoring Air Quality

The Idaho Panhandle National Forests are a party to the North Idaho Smoke Management Memorandum of Agreement (MOA), which established procedures regulating the amount of smoke produced by prescribed fire. A principal objective of the MOA is to "minimize or prevent the accumulation of smoke in Idaho to such a degree as is necessary to protect State and Federal Ambient Air Quality Standards when prescribed burning is necessary for the conduct of accepted forest practices."

The North Idaho group currently uses the services and procedures of the Idaho/Montana State Airshed Group. The procedures used by the Airshed Group are considered to be the Best Available Control Technology by the Montana Air Quality Bureau for major open burning in 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 or not any restrictions on burning are necessary the following day. If smoke intrusion does occur, the district would voluntarily shut down all planned burning operations until the airshed is cleared. In the interest of public safety the district would also work with local, county, and state officials to notify the public of any potential health concerns and mitigation that can be taken, if any, to alleviate these concerns.

In practice, a list of all prescribed burning planned for the year on the Bonners Ferry Ranger District is forwarded to the monitoring unit through the IPNF Dispatch Center before September 1. During periods when burns will be conducted, the Bonners Ferry Ranger District informs the dispatch center by 8:30 a.m. of all burning planned for the next day. This information is forwarded to the monitoring unit. By 3:00 p.m. the same day the monitoring unit informs the Forest if any restrictions are to be in effect the following day, and the dispatch center informs the District. All of these precautions would limit smoke accumulations in the valley to legal, acceptable limits.

a. Indirect Effects Common to All Action Alternatives

Indirect effects, that is to say unplanned emissions, would result from subsequent wildfire events. The question is not *whether* fires will occur in the future, but *when they will occur and how large they become*. This will be directly related to a number of variables including, but not limited to, the condition of the fuels across the landscape, weather patterns, access, and fire suppression policies at the time. However, some estimates of potential emissions from wildfire can be made. Using the SIMPPLLE model, a conservative estimate is that for every 100 acres of wildfire, total emissions would be about 50 tons of particulate matter. The Environmental Protection Agency (EPA) threshold for any single pollutant is 100 tons per day. In essence, the particulates from a 200-acre wildfire would exceed EPA standards.

b. Direct and Cumulative Effects of Alternatives

c. Alternative 1

Alternative 1 includes no prescribed burning and no burning of activity fuels, therefore, it would have no direct effects on air quality; cumulative effects would be those described above for Indirect Effects. The timing of wildfire event(s) are unplanned and the impacts from smoke could well exceed the EPA standards (100 tons of particulate matter for any single pollutant / day) for weeks at a time.

d. Alternatives 2, 3, and 4

Emissions from Alternative 2 would be the result of prescribed underburning and pile burning. The direct effects (estimated emissions) of the action alternatives are displayed in the three following tables.

Based on estimates from FOFEM, Units 8, 30, 33, 38, 48, 57, 125, and 140 would be over the EPA standard of 100 tons of particulate matter for any single pollutant / day. The combined emissions for all burning activities under Alternatives 2, 3, and 4 are estimated at 3054, 2460 and 2033 tons of particulate matter, respectively. These units could exceed the EPA standards if burned in a single year and if the smoke drifted into in a non - attainment area; however, from past experience and monitoring, the smoke from prescribed burning is expected to be transported away from any non-attainment areas (project file). Depending on the sequence and the timing of restoration activities, it may take three to eight years to complete the prescribed burning for the project, diluting the smoke impacts over time.

The important thing to remember is that while the action alternatives produce smoke, the emissions can be managed by choosing the timing, location, and duration of the burning. As described above, all burning is conducted in accord with the North Idaho Smoke Management Memorandum of Agreement (MOA). With Alternative 1, the timing of wildfire event(s) are unplanned and the impacts from smoke could well exceed the EPA standards for weeks at a time.

Table 4-5. Prescribed Burning Air Quality Analysis, Alternative 2
(*Acres and Tons are approximate*)

Alt 2 UNIT	Rx	Fuels Treatment	Acres	PM10 - Lbs/Acre	PM2.5 Lbs/Acre	Total PM_{10} (tons)	Total $PM_{2.5}$ (tons)	Total Emissions (tons)
1	CT/SS	GP	37	999	847	0.500	0.424	**34**
2	CT/SS	GP	12	999	847	0.500	0.424	**11**
3	IC	GP	9	584	495	0.292	0.248	**5**
4	IC	GP	52	999	847	0.500	0.424	**48**
6	ISW	GP/UB	114	584	495	0.292	0.248	**62**
7	ISW	GP/UB	34	584	495	0.292	0.248	**18**
8	GS/CT	GP/UB	232	584	495	0.292	0.248	**125**
9	ST	GP/UB	67	584	495	0.292	0.248	**36**
10	CT/SS	GP	28	999	847	0.500	0.424	**26**
11	CT/SS	GP	61	999	847	0.500	0.424	**56**
12	CT/SS	GP	14	999	847	0.500	0.424	**13**
13	ST	GP/UB	20	584	495	0.292	0.248	**11**
14	GS/CT	GP	51	999	847	0.500	0.424	**47**
15	ISW	UB	6	584	495	0.292	0.248	**3**
16	ISW	GP/UB	34	584	495	0.292	0.248	**18**
17	ISW	UB	9	584	495	0.292	0.248	**5**
19	ISW	GP/UB	67	999	487	0.500	0.244	**50**
20	ISW	GP	64	999	847	0.500	0.424	**59**
22	IC	UB	30	584	495	0.292	0.248	**16**
23	CT/SS	GP	63	584	495	0.292	0.248	**34**
24	ISW	GP/UB	12	584	495	0.292	0.248	**6**
26	IC	UB	34	584	495	0.292	0.248	**18**
27	IC	UB	176	584	495	0.292	0.248	**95**
28	IC	UB	114	584	495	0.292	0.248	**62**
29	IC	UB	29	584	495	0.292	0.248	**16**
30	IC	UB	507	584	495	0.292	0.248	**273**
31	GS/CT	UB	22	584	495	0.292	0.248	**12**
32	GS/CT	GP/UB	83	584	495	0.292	0.248	**45**
33	ISW	UB	125	999	847	0.500	0.424	**115**
38	ST	GP/UB	132	999	847	0.500	0.424	**122**
41	ST	GP/UB	75	999	847	0.500	0.424	**69**
44	ISW	GP/UB	20	999	847	0.500	0.424	**18**
48	CT/SS	GP	324	999	847	0.500	0.424	**299**
53	ST	GP/UB	20	3491	2958	1.746	1.479	**64**
57	ISW	GP/UB	39	3491	2958	1.746	1.479	**126**
58	ISW	UB	48	999	847	0.500	0.424	**44**
59	CT/SS	UB	46	999	847	0.500	0.424	**43**
60	ISW	UB	133	584	495	0.292	0.248	**72**
61	ISW	UB	87	999	847	0.500	0.424	**80**
63	ISW	UB	35	999	847	0.500	0.424	**25**
66	ST	UB	52	999	847	0.500	0.424	**48**
69	ISW	GP/UB	46	999	847	0.500	0.424	**43**
111	ST	UB	51	999	847	0.500	0.424	**47**
112	ST	UB	30	999	847	0.500	0.424	**27**
122	CT/SS	/WLF	256	400	350	0.200	0.175	**96**
125	ISW	GP/UB	123	999	847	0.500	0.424	**114**
129	CT/SS	GP	86	999	847	0.500	0.424	**79**
134	ISW	GP/UB	86	999	847	0.500	0.424	**79**

Alt 2 UNIT	Rx	Fuels Treatment	Acres	PM10 - Lbs/Acre	PM2.5 Lbs/Acre	Total PM_{10} (tons)	Total $PM_{2.5}$ (tons)	Total Emissions (tons)
135	ISW	GP/UB	39	999	847	0.500	0.424	**36**
140	ISW	GP/UB	128	999	847	0.500	0.424	**118**
Ecosystem Burn		UB	110	260	220	0.130	0.110	**26**
Ecosystem Burn		UB	128	260	220	0.130	0.110	**31**
Total			**4255 ac**					**3054 tons**

Table 4-6. Prescribed Burning Air Quality Analysis, Alternative 3
(*Acres and Tons shown are approximate*)

Alt 3 UNIT	Rx	Fuels Treatment	Acres	PM10 - Lbs/Acre	PM2.5 Lbs/Acre	Total PM_{10} (tons)	Total $PM_{2.5}$ (tons)	Total Emissions (tons)
6	ISW	GP/UB	114	584	495	0.292	0.248	**62**
7	ISW	GP/UB	34	584	495	0.292	0.248	**18**
8	GS/CT	GP/UB	232	584	495	0.292	0.248	**125**
9	ST	GP/UB	67	584	495	0.292	0.248	**36**
13	ST	GP/UB	20	584	495	0.292	0.248	**11**
14	GS/CT	GP	51	999	847	0.500	0.424	**47**
20	ISW	GP	64	999	847	0.500	0.424	**59**
22	IC	UB	30	584	495	0.292	0.248	**16**
23	CT/SS	GP	63	584	495	0.292	0.248	**34**
24	ISW	GP/UB	12	584	495	0.292	0.248	**6**
26	IC	UB	34	584	495	0.292	0.248	**18**
27	IC	UB	176	584	495	0.292	0.248	**95**
28	IC	UB	114	584	495	0.292	0.248	**62**
29	IC	UB	29	584	495	0.292	0.248	**16**
30	IC	UB	507	584	495	0.292	0.248	**273**
31	GS/CT	UB	22	584	495	0.292	0.248	**12**
32	GS/CT	GP/UB	83	584	495	0.292	0.248	**45**
33	ISW	UB	125	999	847	0.500	0.424	**115**
38	ST	GP/UB	132	999	847	0.500	0.424	**122**
44	ISW	GP/UB	20	999	847	0.500	0.424	**18**
48	CT/SS	GP	324	999	847	0.500	0.424	**299**
53	ST	GP/UB	20	3491	2958	1.746	1.479	**64**
57	ISW	GP/UB	39	3491	2958	1.746	1.479	**126**
58	ISW	UB	48	999	847	0.500	0.424	**44**
59	CT/SS	UB	46	999	847	0.500	0.424	**43**
60	ISW	UB	133	584	495	0.292	0.248	**72**
61	ISW	UB	87	999	847	0.500	0.424	**80**
63	ISW	UB	27	999	847	0.500	0.424	**25**
66	ST	UB	52	999	847	0.500	0.424	**48**
69	ISW	GP/UB	46	999	847	0.500	0.424	**43**
111	ST	UB	51	999	847	0.500	0.424	**47**
112	ST	UB	30	999	847	0.500	0.424	**27**
122	CT/SS	/WLF	256	400	350	0.200	0.175	**96**
125	ISW	GP/UB	123	999	847	0.500	0.424	**114**
134	ISW	GP/UB	86	999	847	0.500	0.424	**79**
135	ISW	GP/UB	39	999	847	0.500	0.424	**36**
Total			**3303 ac**					**2460 tons**

Table 4-7. Prescribed Burning Air Quality Analysis, Alternative 4
(*Acres and Tons shown are approximate*)

Alt4 UNIT	Rx	Fuels Treatment	Acres	PM10 - Lbs/Acre	PM2.5 Lbs/Acre	Total PM_{10} (tons)	Total $PM_{2.5}$ (tons)	Total Emissions (tons)
1	CT/SS	GP	37	999	847	0.500	0.424	**34**
2	CT/SS	GP	12	999	847	0.500	0.424	**11**
3	IC	GP	9	584	495	0.292	0.248	**5**
4	IC	GP	52	999	847	0.500	0.424	**48**
6	ISW	GP/UB	114	584	495	0.292	0.248	**62**
7	ISW	GP/UB	34	584	495	0.292	0.248	**18**
8	GS/CT	GP/UB	232	584	495	0.292	0.248	**125**
9	ST	GP/UB	67	584	495	0.292	0.248	**36**
10	CT/SS	GP	28	999	847	0.500	0.424	**26**
11	CT/SS	GP	61	999	847	0.500	0.424	**56**
12	CT/SS	GP	14	999	847	0.500	0.424	**13**
13	ST	GP/UB	20	584	495	0.292	0.248	**11**
14	GS/CT	GP	51	999	847	0.500	0.424	**47**
15	ISW	UB	6	584	495	0.292	0.248	**3**
16	ISW	GP/UB	34	584	495	0.292	0.248	**18**
17	ISW	UB	9	584	495	0.292	0.248	**5**
19	ISW	GP/UB	67	999	487	0.500	0.244	**50**
20	GS/CT	GP	64	999	847	0.500	0.424	**59**
22	IC	UB	30	584	495	0.292	0.248	**16**
23	CT/SS	GP	63	584	495	0.292	0.248	**34**
24	ISW	GP/UB	12	584	495	0.292	0.248	**6**
26	IC	UB	34	584	495	0.292	0.248	**18**
27	IC	UB	176	584	495	0.292	0.248	**95**
28	IC	UB	114	584	495	0.292	0.248	**62**
29	IC	UB	29	584	495	0.292	0.248	**16**
30	IC	UB	507	584	495	0.292	0.248	**273**
31	GS/CT	UB	22	584	495	0.292	0.248	**12**
32	GS/CT	GP/UB	83	584	495	0.292	0.248	**45**
48	CT/SS	GP	324	999	847	0.500	0.424	**299**
53	ST	GP/UB	20	3491	2958	1.746	1.479	**64**
59	CT/SS	UB	46	999	847	0.500	0.424	**43**
60	ISW	UB	133	584	495	0.292	0.248	**72**
122	CT/SS	/WLF	256	400	350	0.200	0.175	**96**
129	CT/SS	GP	86	999	847	0.500	0.424	**79**
140	ISW	GP/UB	128	999	847	0.500	0.424	**118**
Ecosystem Burn		UB	110	260	220	0.130	0.110	**26**
Ecosystem Burn		UB	128	260	220	0.130	0.110	**31**
Total			3051 ac					**2033 tons**

4.3-G. Restoration Costs

Restoring forested ecosystems carries with it some inherent costs. Some of these costs can be mitigated through revenues, such as from the sale of wood products harvested, in order to meet desired ecosystem objectives. The estimated costs of Alternatives 2, 3, and 4 were calculated by use of the USFS Timber Sale Appraisal (project file document TRANS-04) and are disclosed below.

G.1- Alternative 1

a. Direct, Indirect and Cumulative Effects

Alternative 1 includes no prescribed burning or silvicultural treatments. Consequently, neither direct costs nor revenues would be generated under this alternative.

However, the indirect and cumulative effects of the costs of taking no action are subtle. In the Mission Brush project area, as these systems trend further from historic conditions (loss of old growth ponderosa pine, declines in white pine and larch, etc.) the costs of restoration will increase over time. As studies have shown, the risks and probabilities of changes in ecosystems are likely to be related to the magnitude and direction of departures from the historical range of variability. Such risks have both ecological (Covington et al 1994) and societal dimensions (McKetta et al 1994). When ecosystems are outside the historical range of variability, changes may occur dramatically and rapidly. An investment of money, energy, or human effort may be required (Morgan et al 1994). Restoring ecosystem composition and structure will require some sort of financial investment.

G.2- Alternative 2

a. Direct, Indirect and Cumulative Effects

The direct total costs of restoration treatments under Alternative 2 are estimated to be over $3,500,000 (see the following table). However, based on an appraisal of the anticipated timber sale volume removed to achieve restoration objectives, Alternative 2 is expected to generate more revenue than costs. Estimated timber volume removed under Alternative 2 is about 23.5 million board feet (23.5 MMBF). The timber sale appraisal conducted for this volume of timber estimated that the advertised rate for the sale of timber would be about $117 per thousand board feet (MBF). The history of the Bonners Ferry Ranger District has shown that these types of sales are often bid up to twice their advertised rate, following the trend in this case a bid of $234/MBF would not be unusual. Consequently, through timber sale receipts, Alternative 2 is expected to generate at least $2.7 million in revenue and as much as $3.5 million if the sale is bid up close to historic rates. Additional deposits for brush disposal (BD) are expected to be over $1.2 million. In summary, the anticipated revenues for Alternative 2 are expected to be far more than the costs.

The indirect and cumulative effects of Alternative 2 are again related to improvements in forest composition and structure, wildlife habitat, and road improvements that will reduce sediment into the aquatic ecosystem; all through the use of timber sale funds. As these systems are restored toward their more stable and resilient historic conditions, the future financial costs of maintaining (e.g., silvicultural treatments and prescribed fire) and protecting (e.g., from fire, insects, and disease) these forests would be greatly reduced.

Table 4-8. Restoration Costs for Alternatives 2, 3, and 4
Values are rounded from appraisal estimates

Item	Alt 2	Alt 3	Alt 4
Value of Timber Harvested (revenue)	2,746,000 to 3,542,000	(+) 2,009,000 to 2,672,000	(+) 992,000 to 1,446,000
Brush Disposal (BD) Deposits from Timber Sale Receipts	(+) 1,228,000	(+) $1,156,000	(+) 1,113,000
Underburning (costs)	(-) 1,851,000	(-) 1,714,000	(-) 1,229,000
Burn Pile and Landings (costs)	(-) 111,000	(-) 80,000	(-) 76,000
Grapple Piling – fuel breaks (costs)	(-) 252, 000	(-) 178,000	(-) 171,000
Slashing Understory Fuels (costs)	(-) 25,000	(-) 16,000	(-) 25,000
Reforestation (costs)	(-) 1,047,000	(-) 804,000	(-) 414,000
TOTAL Value ($)	(+) $688,000 to $1,484,000	(+) $373,000 to $1,036,000	(+) $190,000 to $644,000

The following expenses would be borne by the timber sale purchaser.

* Fireline Construction	$81,000	$71,000	$42,000
* landing piles * yarding tops w/ helicopter	$11,000 $96,000	$9,000 $96,000	$8,000 $96,000
* Limbing and Lopping Sawlogs	$47,000	$39,000	$26,000
* Road Improvements	39 miles ~ $161,500	37 miles ~ $158,500	26 miles ~ $62,800

4.3-H. Reasonably Foreseeable Actions

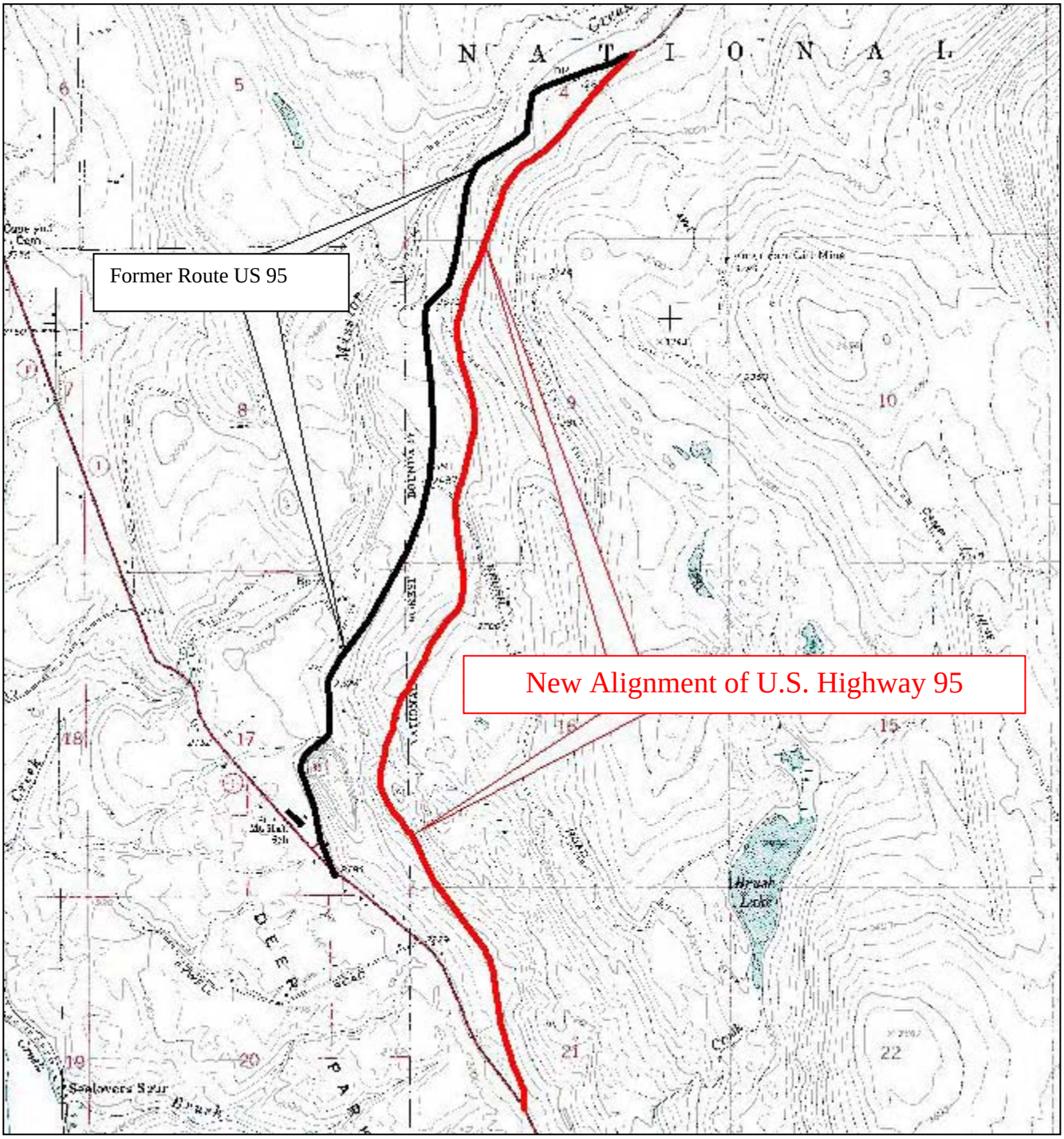
The following current and ongoing activities are expected to continue in the Mission Brush project area regardless of the alternative implemented.

- Other restoration projects - noxious weeds monitoring and treatment, native seeding and timber stand improvement (tree thinning and pruning in plantations).
- Public uses include: gathering firewood, huckleberries, fishing and dispersed types of recreation.
- Timber harvest on federal and private lands and within the Canadian portion of Mission Creek watershed. The cumulative effects of the past, present and future activities were included in the watershed analysis and integrated into the alternative development.

Changes between the 2004 FEIS and the 2005 Supplemental Final EIS

- US Highway 95 Realignment – As mentioned in the 2004 FEIS, the realignment of U.S. Highway 95 in the project area was a foreseeable action and the effects were accounted for in the analysis. The project is now complete and can be seen in the FEIS Figure 4-13 on the following page. Impacts to the Mission Brush project area included the loss of about 100 acres of forest stands, including 23 acres of allocated old growth, big game winter range, and the increased risk of human-caused fires. The cumulative effects were included in the watershed analysis and integrated into the alternative development.
- Canadian TEMBEC Forest Products Company has now completed harvest activities described in the 2004 FEIS as a reasonably foreseeable activity. The cumulative impacts were accounted for in the project design, and analysis where appropriate (project file).

Figure 4-13. U.S. Highway 95 Realignment - Project Now Complete



4.4 Old growth

4.4-A. Recommendations

Recommendations for maintenance of dry forest old growth stands, based on studies of historical old growth structures, are summarized below.

Reintroducing fire alone will not restore most old growth stands because of unprecedented accumulations of duff and ladder fuels. The dense understories, including many trees whose crowns extend into the overstory canopy cannot now be killed by fire without damaging the old growth trees (Harrington 1991).

Old trees need relatively open conditions to maintain modest growth rates and survive several hundred years. Low-vigor trees are unable to marshal enough resources to maintain adequate defense. Large trees growing in a dense layer of smaller trees are especially vulnerable to attack, underscoring the importance of maintaining reasonable growth rates (Arno and Fiedler 2005).
Treatments in and old growth larch and ponderosa pine stand on the Lolo NF in the late 1990's reduced basal area about 16% from 144 to 121 ft^2 per acre using the least intensive treatment, compared to the most intensive treatment that reduced basal area by about 48% from 145 to 76 ft^2. Results three years later showed old growth trees had increased sap flow, higher foliar nitrogen content, and higher foliage production (Sala and Calloway 2001), indicating improve tree vigor and increase resistance to insects and disease.

Stone et al (1999) also found that restoration of pre-Euro-American stand structure by thinning improved vigor of ancient, pre-settlement ponderosa pines in northern Arizona. Increased canopy growth and increased uptake of water, nitrogen, and carbon indicated improved tree vigor. They concluded in their study that the negative influence of post-settlement trees on pre-settlement trees likely resulted from competition for soil resources. Their conclusion agreed with correlative studies conducted at their study site by Sutherland (1983) and Biondi (1996).

Fiedler et al. (1988) recommended residual densities of 50-80 ft^2 of basal for management of uneven-aged ponderosa pine stands in the Northwest, and O'Hara (1995) recommended densities of 98 ft^2 of basal area with the primary objective of restoring pre-settlement ponderosa pine structure featuring large trees and younger cohorts as replacement trees.

4.4-B. Changes between the FEIS/ROD and the SFEIS

Based on the old growth review some changes in old growth allocation were recognized in OGMUs 19 and 20. Therefore, there would be some slight changes in the number of proposed treatment acres in dry forest old growth. These changes are discussed below.

a. Alternative 1
There were no changes in the analysis for old growth between the 2004 FEIS/ROD and this SFEIS. The analysis for Alternative 1 is incorporated by reference.

b. All Action Alternatives

These alternatives include entry into 277 acres of dry site old growth stands (Table 4-9). Silvicultural prescriptions, including periodic underburning, would be designed to retain the old growth ponderosa pine, western larch, and even the scattered old growth Douglas-fir, in the treated stands. Additionally, trees from smaller size classes would be retained to provide additional structural diversity and replacement old growth for the future. In the long-term, these conditions would be more sustainable.

For Alternatives 2 and 4 the 2004 FEIS/ROD (Appendix E) disclosed there would be 344 acres of treatments in dry forest old growth stands. Most of the reduction in acres between the 2004 FEIS/ROD and 2005 SFEIS resulted from two stands (71909008 and 71909027) being dropped from the allocation because they were fragmented by the new Highway 95 realignment. There were also some minor changes in the GIS stand layer as the TSMRS database was updated, which accounted for the remainder of the acreage changes in Alternatives 2 and 4.

The only changes between the 2004 FEIS/ROD and the SFEIS for Alternative 3 relate to these minor changes in the GIS layer. Appendix E of the 2004 FEIS/ROD disclosed there would be 310 acres of treatments in dry forest stands, compared to the updated 277 acres.

c. Results and Direct, Indirect and Cumulative Effects; Forest Plan Standards

Based on our old growth review, there would actually be fewer acres of treatments in dry forest old growth in the SFEIS than discussed in the 2004 FEIS/ROD. The changes in old growth allocation between the FEIS/ROD and SFEIS did not change the intent of the prescriptions - which is to improve the long-term health of these dry forest stands whether they are classified as old growth, or not.

Therefore, the direct, indirect, and cumulative effects included in the 2004 FEIS/ROD regarding old growth have not changed.

None of the actions alternative would result in a net loss of allocated old growth. Consequently, Forest Plan standards for old growth maintenance and distribution would be met.

Table 4-9. Old Growth Stands with Proposed Treatments – All Alternatives

Stand ID	Treatment Unit(s)	Treatment Acres in Old Growth
71901002	#22, #122	28
71901030	#26	17
71901091	#30	32
71901093	#28, #30	194
71901097	#30	6
TOTAL		277

4.4-C. Consistency with the Forest Plan

a. Old Growth

Standard 10(a) – This standard incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in Green (Green and others 1992, corrected 02/2005), "Old Growth Forest Types of the Northern Region. USDA, Forest Service, Northern Region." The allocated old growth within the Mission Brush project area meets the old growth definitions included in Green and others, 1992, corrected 02/2005.

The Mission Brush EIS complies with Forest Plan standard 10 (a).

Standard 10(b) – This standard calls for maintaining "at least 10% of the forested portion of the Idaho Panhandle National Forests as old growth". The forest plan identified 2,310,000 forested-acres on the Idaho Panhandle National Forests. Therefore, the forest plan standard requires maintaining 231,000 acres of old growth on the forest. Based on two independent inventory and monitoring tools (FIA and IPNF stand level inventory) the IPNF is maintaining over 12% allocated old growth on its forested acres. As part of the Forest Plan strategy, 65,853 acres (16.7%) on Bonners Ferry Ranger District are allocated for old growth management (2004 IPNF Forest Plan Monitoring report).

The Mission Brush EIS complies with Forest Plan standard 10 (b).

Standard 10 (c) – For distribution purposes, the Forest Plan directs Districts to select and maintain at least 5% of the forested portion of those old-growth units that have 5% or more old growth. These forests have a unique structure and composition that provides critical habitat for a wide range of plants, animals, and other biota. Forest Plan direction is to maintain at least 10 percent of the forested portion of the IPNF as old growth. For distribution purposes at least 5% of each old growth management unit (OGMU) must be maintained as old growth. The Mission Brush assessment area intersects OGMU 19 and 20.

- OGMU 19 is about 3,105 acres and contains 397 acres (13%) of old growth.
- OGMU 20 is about 13,020 acres and contains 1,568 acres (12%) of old growth.

OGMU 19 and OGMU 20 encompass about 16,125 acres of National Forest, and 1,965 acres (over 12%) are included in the IPNFs old growth allocation. All 397 acres of old growth found in OGMU 19 are on dry forest types. Most of this old growth type is in poor health as described in Chapter 3. Protecting these

vanishing stands from lethal fire and overcrowding is one of the reasons for proposing the project.

The Mission Brush EIS complies with Forest Plan standard 10 (c).

Standard 10 (d) – Existing old growth stands may be harvested when there is more than 5% old growth in an old-growth management unit, and the Forest total is more than 10%. All three action-alternatives include entry into allocated dry-forest old growth. Silvicultural prescriptions would be designed to retain the old growth ponderosa pine, western larch, and Douglas-fir, in the treated stands. Additionally, trees from smaller size classes would be retained to provide additional structural diversity and replacement old growth for the future. In the long-term, these conditions would be more sustainable. These alternatives would result in no net loss of allocated old growth.

The Mission Brush EIS complies with Forest Plan standard 10 (d).

Standard 10(e) – At the Forest level, old-growth stands should reflect approximately the same habitat type series distribution as found on the IPNF. As discussed in the 2003 IPNF Forest Plan Monitoring report (p.92), old growth on the IPNF does reflect approximately the habitat type series distribution of the forest. In OGMUs 19 and 20, which represents less than 1% of the IPNF's acres, the warm and dry Douglas-fir habitat type series constitutes a higher percentage of forest habitats as compared to the Forest as a whole. In particular, the Douglas-fir habitat type series accounts for 23% of the old growth (all in OGMU 19), as compared to less than 3% at the Forest level. As is the case on most of the IPNF the western hemlock habitats (56%) are the dominant old growth type, although this percentage is higher than the IPNF average of 40%. The remaining old growth in the Mission Brush project area is found on subalpine fir (18%) and western red cedar (3%) habitat types.

The Mission Brush EIS complies with Forest Plan standard 10 (e).

Standard 10 (f) – The Forest Plan also has standards for size of old growth stands (Forest Plan II-29). Preference is to have at least one stand per OGMU over 300 acres and stands should be at least 25 acres. Preference 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. This old growth review showed that one contiguous patch of old growth is 923 acres in OGMU 20 and two others are larger than 200 acres. One patch of old growth in OGMU 19 (Figure 4-16) is larger than 200 acres. Some of these patches are within one mile of each other. Seven stands are less than 25 acres, but these stands are generally less than a quarter-mile from other larger patches of old growth. In OGMUs 19 and 20 stands less than 25 acres in size account for about 6% (111 acres) of the total old growth in these OGMUs. Consequently, even if these acres were not considered as part of the allocation, OGMUs 19 and 20 would still meet old growth standard 10(c), which calls for maintenance of 5% old growth in each OGMU, if available.

The Mission Brush EIS complies with Forest Plan standard 10 (f).

Mature and old growth forest trends

Additionally, the trend on the District is to grow more acres of mature and old growth forests. The District has a total of approximately 394,000-forested acres and roughly 291,000 acres are considered suitable for timber management in the Forest Plan. This means about 25% of the District's forest acres are not included in a timber management allocation.

Since 1955, considering only the 291,000 suitable acres, the District has harvested over 53,000 acres using even-aged regeneration (i.e., clearcut, seed tree, and shelterwood – Figure 4-14 below). This equates to less than 1,100 acres of even-aged regeneration cutting annually. Using a forest regulation basis of 100-year rotations, which the 1987 Forest Plan assumed, the District would need to regenerate an average of about 2,900 acres (1%) annually to achieve regulation under these conditions. The average of less than 1,100 acres (less than 0.4%) regenerated annually equates to an actual rotation length of more than 260 years.

Furthermore, since the inception of the 1987 Forest Plan the District has regenerated an average of about 850 acres using even-aged regeneration harvesting and since the early 1990s this rate has dropped to about 450 acres annually. The highest rate of regeneration was in 1988 at about 2,240 acres, but still a regeneration rate of less than 1% annually. See the following chart showing the District's regeneration harvest history since 1955.

In the project area, over the past 30 years, the District has been regenerating forests at a rate of slightly less than 80 acres per year (2,387 acres since 1974 – Chapter 3, Figure 3-10) Adding the acres of even-aged regeneration harvesting from Alternative 2 (over 700 acres), which is the highest among the three action alternatives, brings the 30-year average of even-aged regeneration harvesting to a little more than than100 acres per year, or about 0.6% of the project area. Given that Forest Plan standards are currently being met at the Forest, District, and project scales and, about one-third of the District acres and 37% of the acres in

the Mission Brush project area are in mature forests, and given the relatively low regeneration rates, the long-term trend at all scales is toward the development of more old growth, and larger patches, within the next 20-50 years.

Standard 10 (g) – This standard states that roads should be planned to avoid old-growth management stands to maintain unit size. No roads will be built through old growth under either action alternative.

The Mission Brush EIS complies with Forest Plan standard 10 (g).

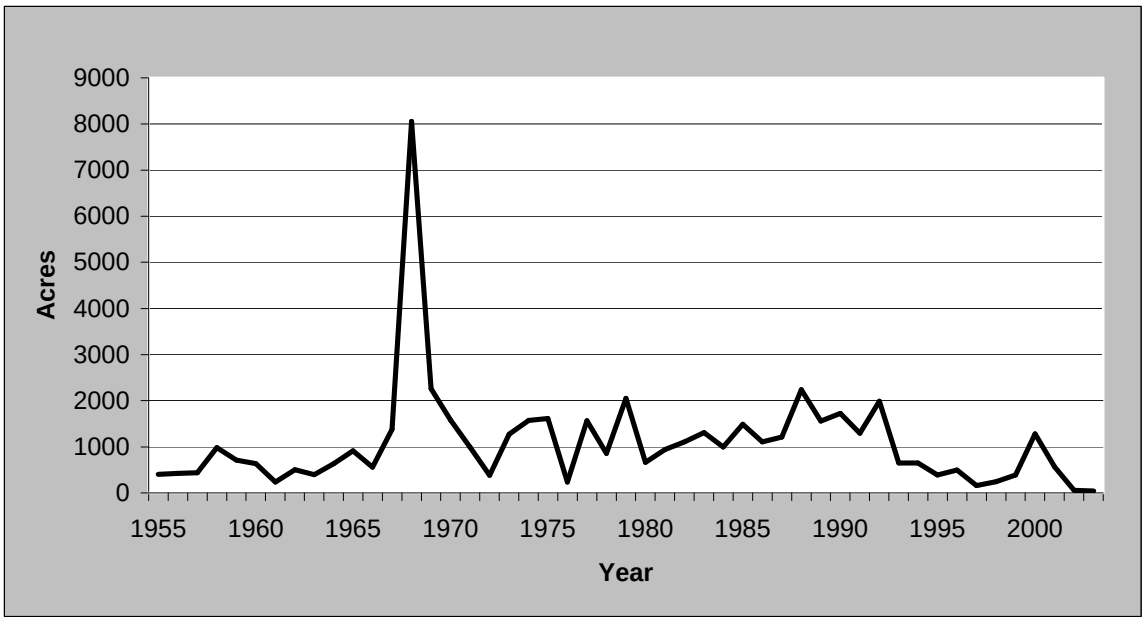
Standard 10 (h) –Existing grazing allotments will be honored, however, a long-term objective should be to minimize or exclude domestic grazing within old-growth stands. New allotments in old-growth stands will not be allowed. There are no grazing allotments in the Mission Brush project area, and consequently, no allotments in old growth. Furthermore, no new allotments are planned for the area.

The Mission Brush EIS complies with Forest Plan standard 10 (h).

Standard 10 (i) –Goals for lands to be managed as old growth within those lands suitable for timber production are identified in the management area prescriptions. The 2003 IPNF Forest Plan Monitoring report (p. 92) shows both those 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.

Figure 4-14. District-wide Even-Aged Regeneration Harvest History (Bonners Ferry Ranger District)



1968 shows a large spike due to timber salvage operations related to large-scale fires in 1967 (Sundance and Trapper Peak).

Figure 4-15. Mission Brush Old Growth Patches (South of Hwy 95)

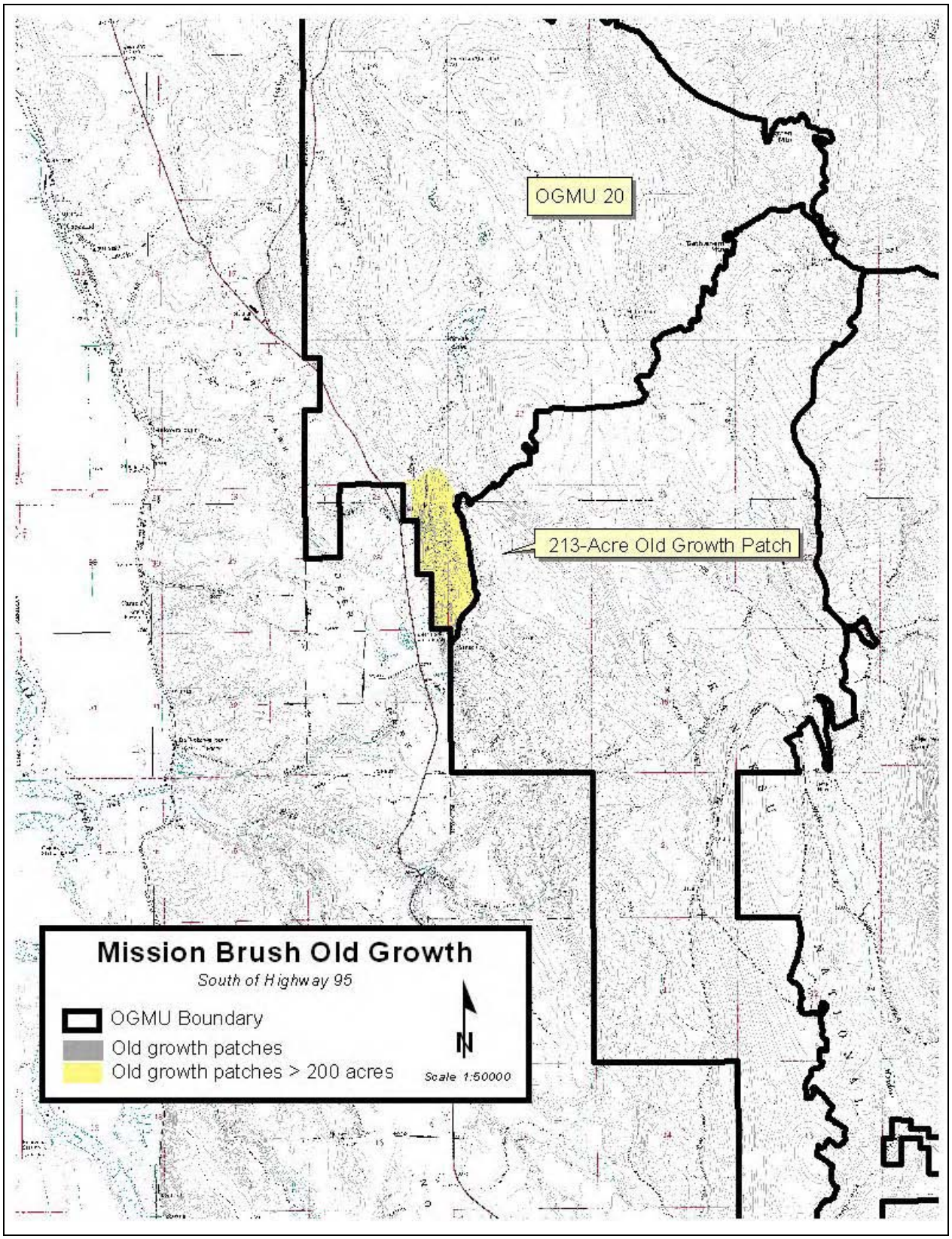
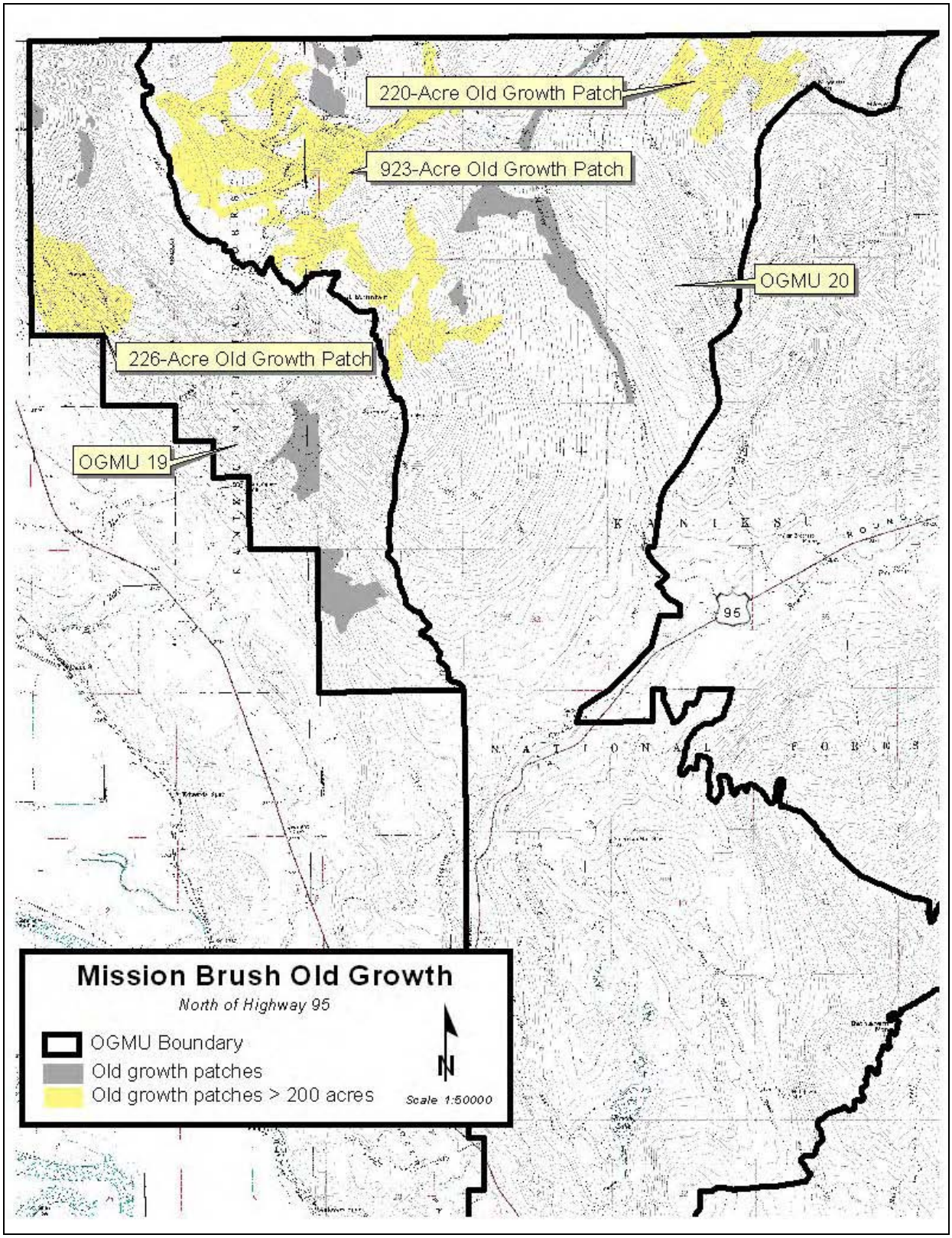


Figure 4-16. Mission Brush Old Growth Patches (North of Hwy 95)



4.4-D. Reforestation

a. Alternatives 2, 3, and 4

These alternatives include some regeneration harvests. Site preparation and fuel reduction would provide appropriate sites for planting. Following site preparation (usually by underburning) regeneration would occur through artificial (planting) and natural methods. Seral species (white pine, larch, and ponderosa pine) would be planted to promote stand structures and species composition, which reduce susceptibility to insect and disease damage. For details on unit prescriptions and sizes, refer to the tables and maps in Chapter 2.

The best quality ponderosa pine, western larch, and white pine would be retained for natural seed sources - consistent with Forest Plan direction that "reforestation would feature seral tree species". All stands proposed for regeneration harvests 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 grown 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, page II-32, Forest Plan).

Forest Plan standards for reforestation would be met under all action alternatives.

4.4-E. Lands Suitable for Timber Production

All Alternatives

This project includes lands that were designated as unsuitable for timber production in the Forest Plan (MA9). Timber Standard 3, Forest Plan page II-32, allows changes in land suitability classification based on recommendations of a certified silviculturist. In accordance with this, all or portions of Units 4, 6, 8, 19 have been field reviewed and re-classified as suitable for timber production. Units 23, and 26-32 are in MA-9 and contain the dry site old growth that is at risk from insect, disease and stand replacement fire.

4.5 Aquatics

4.5-A. Methodology

Ultimately, the effects of the project on stream channels is the main concern for watershed and fisheries resources. Hillslope conditions are reflected in stream channels, which in turn are the formative features of aquatic habitat. The analysis of direct and indirect effects is based on how the various components of the project (e.g., location, size of cutting units, methods of logging systems, road construction and road work, and reasonably foreseeable actions) are expected to affect Mission Creek and its tributaries, as well as Brush Creek.

Relationship of the Analysis to the 2004 FEIS Analysis

The Methodology section explicitly explains the limitations of the models used for analysis within the project area. It also explains other methodologies and references used to assist in the analysis.

Changes between the 2004 FEIS/ROD and the Supplemental FEIS

Further clarification of the appropriate uses and known limitations of the WATSED model are provided to help the public and the decision maker better understand this model and how it is used in the overall aquatics analysis for this project.

A.1- The WATSED Model – Supplemental Information

WATSED Model Limitations
The discussion of analysis methodologies needs to include appropriate discussion of the limitations of the computer-generated WATSED model. (Lands Council v. Powell, 395 F.3d 1019 (9th Cir. Amended opinion, 2005).

A.2- Aquatics Review of Cumulative Effects of Past Harvest Activities

As explained earlier in this document (Chapter 1 sections 1.4-A and 1.7-A.1; Chapter 2 section 2.2-A, and Chapter 3 section 3.3-B), past activities that were relevant to the watershed and fisheries cumulative effects analysis are included in the analysis of cumulative effects. Others, such as tree planting and firewood gathering, do not result in soil or watershed disturbance so they aren't included in the discussion. The activities on private lands were also considered; thus there are no changes to the cumulative effects conclusions between the 2004 FEIS and this Supplemental FEIS for this project

A.3- Water Yield

Analysis peak flow represents the change in runoff and is expressed as the percent change from the estimated "natural" peak month discharge. The WATSED model was used for this analysis to estimate the effects of the proposed timber harvest and construction of temporary and classified roads on water yields. Sediment Risks/Benefits associated with The anticipated change in sediment risk associated with road decommissioning, storage and improvements is included in this discussion. Changes in miles of roads in wetland or riparian areas for each alternative will be compared to the existing miles of road, and the benefits of decommissioning roads will be discussed.

Past, present and reasonably foreseeable actions such as Canadian and private timber company logging activities and the construction of the U.S. Highway 95 realignment through the lower Mission Creek drainage are included in this analysis. Changes in peak flows are compared to the existing peak flows discussed in the Affected Environment, Reference Conditions section (Chapter 3, Figure 3-32). The estimated direct and indirect effects analysis timeframe for water yields for all alternatives are through 2035, when water yields recover to baseline.

A.4- Sediment Yield – Analysis

Percent increase in sediment yield above natural conditions is calculated for each alternative using the WATSED model. This percent is compared to the current sediment load discussed in the affected environment section. The proposed timber harvest units and construction of temporary and classified roads are included in the analysis. Some of the reasonably foreseeable actions discussed below are also calculated in the analysis. The estimated short-term or direct and indirect effects analysis timeframe for sediment yields is through 2015, the latest year that sediment yield would recover to baseline.

a. Sediment Risks/Benefits associated with road decommissioning and improvements

The anticipated change in sediment risk associated with road decommissioning, storage and improvements is included in this discussion. Changes in miles of roads in wetland or riparian areas for each alternative will be compared to the existing miles of road, and the benefits of decommissioning roads will be discussed. Past timber harvesting on private lands as well as within Canada are also modeled. Plus, the reconstruction of Highway 95 is included.

b. Mass Failure Potential in Hall Mountain Area

In addition to buffering high mass failure potential landtypes using INFISH standards, (USDA Forest Service, 1995), the LISA model was used to evaluate the risk of failure on the west facing slopes of Hall Mountain. If a probability of failure existed, proposed units were either eliminated or the percent stem removal was set at acceptable levels in all action alternatives. The relative increase in the probability of failure after timber harvest as modeled by LISA will be discussed.

Direct and Indirect Effects

The effects of each alternative are described by watershed area (Mission Creek, Brush Creek or Hall Mountain) and are further broken down for each area by type of analysis such as stream characteristics, watershed and erosional processes, or sediment delivery.

Alternative 1

Effects in Mission Creek Area

Since no management activities would be implemented with this alternative, there would be no direct or indirect effects associated with this project.

Stream Channel Characteristics

Channel stability and risk of instream sediment inputs from failing logjams would remain the same and be subject only to natural fluctuations in streamflow.

Watershed and Erosional Processes

Under this alternative, no road obliteration, road storage or road improvements would occur. Water and sediment yield values and trends as discussed in the affected environment would not change from existing conditions and predicted trends. Water yield values would continue to decrease to less than 5% by 2015.

Risks associated with undersized culverts and ditchline problems would remain. Forest System Road (FSR) 272 would not be improved or resurfaced, which is the largest risk of sediment from roads in Mission Creek drainage.

The risk of sediment increases associated with current road conditions would remain, and road failures could occur under the following conditions. First, if a large stand replacing fire occurs and is then followed by a high intensity rain or a rain-on-snow event. Or second, the occurrence of a rain-on-snow event, as discussed in the affected environment section, may also lead to road failures. Under both scenarios, if a flash flood and/or debris flow is triggered by either event, culvert failures (due to plugged culverts) or the exceedence of culvert capacity could occur. Water may then be concentrated over the top of road fills or diverted down the road or ditch and onto hillslopes unaccustomed to concentrated overland flow.

Effects in Brush Creek Area

Watershed and Erosional Processes

Roads encroaching on wetlands would not be decommissioned. Motorized access to wetlands would not decrease. Wetland degradation would continue disturbing wetland function and important aquatic and terrestrial habitat.

Effects in Hall Mountain Area

Watershed and Erosional Processes

Risk of mass failures on Hall Mountain would fluctuate based on activities on private lands or slope destabilization due to past activities only. The obliteration of Road 272-C, which would help establish natural slope hydrology in areas of past failures, would not occur. Risk of failure associated with this road would remain the same.

Alternatives 2, 3, and 4

c. Watershed and Erosional Processes

Over 80% of the treatment acres in the Mission Creek Watershed are located in the Lower Mission and Main Mission sub-watersheds. This area is referenced as the Lower Mission Creek Watershed or Lower Mission within the effects analysis section. These two areas are the greatest concern for potential sediment and water yield increases due to the sensitivity of this area. Modeling these two sub-watersheds together presents a worse case scenario of the proposed management activity effects on sediment and water yields.

Effects in Brush Creek Area

WATSED modeling results within the sub-watersheds other than Lower Mission Creek (or Lower Mission) are less than or equal to the results presented below, therefore they can be referenced within the project file.

Effects in Mission Creek Watershed

Sediment Yield

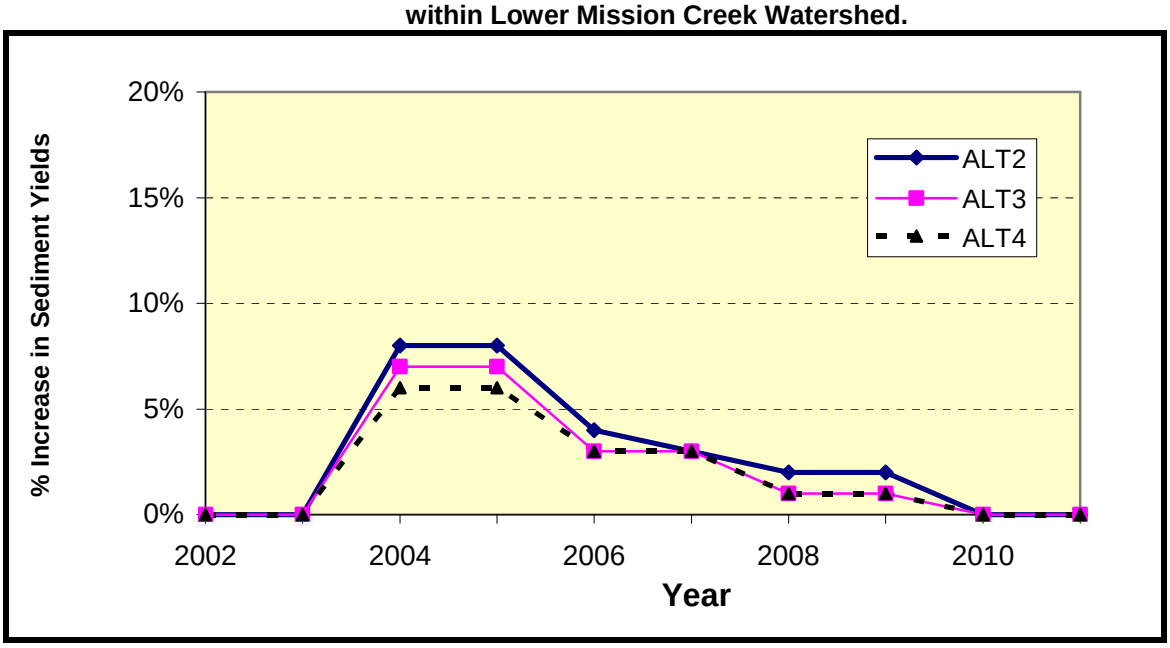
Changes in sediment yield values for the three alternatives over the term of the project are displayed in Figure 4-14 and within the watershed project file. Timber harvesting, wildlife burning and temporary road construction are modeled. These estimates do not include the reduction in sediment from the decommissioning of roads.

Alternative 2 resulted in an eight percent increase over existing conditions;
Alternative 3 resulted in a seven percent increase, and
Alternative 4 resulted in a six percent increase over existing conditions.
Recovery back to existing condition occurs by 2010 for all three action alternatives.

The differences in sediment yield increases between all action alternatives were only one to two percent. Given the natural sediment yield fluctuations as described in the reference and existing conditions, a six to eight percent increase falls within the natural variability and would not be a detectable difference compared to the No Action Alternative. Research studies on estimating sediment yields claim that small incremental or short-term increases are largely unpredictable (Bunte and MacDonald 1998). Natural physical processes such as flow, bedload transport, local turbulence and sudden events such as bank erosion or movement of large woody debris can alter sediment prediction values very easily (Bunte and MacDonald 1998).

Recent WATSED validation runs indicated that the WATSED measured responses were accurate for flow, but appeared to over estimate sediment loads (USDA 2000). As mentioned before, the model is one tool used to analyze effects and is used as a relative comparison of alternatives.

Figure 4-17. Alternative comparisons of increases in sediment yield over existing conditions within Lower Mission Creek Watershed.



Alternative 1 is not shown since it is assumed it would be a zero percent increase from the existing condition.
This graph does not reflect decreases in sediment yield due to road decommissioning, storage or removal of at-risk culverts.

d. Estimated Effects of Timber Harvesting, Site Preparation & Temporary Road Construction on Sediment Yields

Alternative 3 would not construct any temporary roads.

In Alternatives 2 and 4, 2.5 miles of temporary roads would be constructed within the Mission Creek analysis area. These temporary roads are designed and planned as part of the transportation system to ensure that design criteria discussed in Chapter 2 are followed in order to provide proper road surface drainage, and to minimize soil disturbance.

For the following reasons, the risk of sediment delivery from temporary road construction proposed in Alternatives 2 and 4 would be even less than predicted. Temporary road construction activities:

- would not occur on sensitive landtypes;
- would cross only intermittent draws;
- would be over 1,000 feet from Mission Creek or its tributaries; and
- would incorporate design features described in Chapter 2,.

Alternative 3 does differs from Alternatives 2 and 4 in Mission Creek Watershed because it would not construct temporary roads. No difference is expected in sediment yield due to temporary road construction when comparing Alternative 3 to Alternatives 2 or 4 for the following reasons:

- There is only a 1% modeled difference in sediment yields between the alternatives, and that difference would not be measurable (see Sediment Yield above), and
- The recovery period is the same for the alternatives.

When the temporary roads are no longer needed, they will be decommissioned, which will have the following benefits:

- restore slope stability
- eliminate surface erosion, and
- eliminate the requirement for future road maintenance.

e. Effects of Road Decommissioning on Sediment

Alternatives 2, 3, and 4: Proposed road decommissioning and storage are the same for each alternative. Figures 2-9 and 2-10 and Tables 2-14 and 2-15 provide a detailed list of the proposed treatments. The 8.6 miles of roads proposed for decommissioning are currently inaccessible to motorized traffic. They are either gated or grown in with vegetation.

Temporary road construction and road improvements vary by alternative, miles can be found in Chapter 2 Table 2-13. A summary of the proposed road treatment miles by drainage area is listed in the following table.

Table 4-10. Summary of proposed road treatments in miles

	Decommission	Store
Mission Creek Drainage	7	4.5
Brush Lake Area	5	0
Hall Mountain Area	0.5	0
Total	12.5	4.5

WATSED is unable to estimate the sediment delivery reductions and time period for recovery back to natural conditions as a result of decommissioning roads. Therefore, the long-term reduction in sediment delivery from the decommissioning of 10 miles of existing roads in the Mission Creek watershed is not depicted in the WATSED outputs. Research has shown recovery of decommissioned roads within three to five years following the work (Hickenbottom 2001, USDA 2001, and Redente et al 1994). Monitoring of previous road decommissioning on the Bonners Ferry Ranger District has shown recovery within this time frame (IPNF Monitoring Report, 2002).

f. Effects of Road Storage on Sediment

Alternatives 2, 3, and 4: The three action alternatives propose to store 4.5 miles of roads within the Mission Creek analysis area. Roads are placed in "storage" when the road will not be used for several years, but will be needed in the future and therefore cannot be fully decommissioned. Road storage includes removing culverts and re-contouring stream crossings, water barring and re-contouring slopes as needed to stabilize the roadway. The majority of the road prism is not removed. With road storage, the risk of culvert failure and sediment delivery to the stream system is mitigated while leaving the road prism on the landscape for future use.

Waterbarring roads is an approved BMP for use in preventing water from running down the road and potentially destabilizing it. Removing culverts and restoring stream crossings decreases the potential for sediment production due to failed culverts. These are also techniques used in road decommissioning and storage discussed above. More information can be found in IPNF Monitoring Reports, also located on the internet at http://www.fs.fed.us/ipnf/eco/manage/monitoring.

g. Effects of Road Improvement on Sediment Delivery

Road improvement on FSR 272, 272-A and 2206 would improve ditch drainage by accomplishing the following items:

- adding culverts and replacing undersized culverts,
- replacing degraded road surface (both asphalt sections and graveled sections), and
- stabilizing cut banks.

Several studies have shown that stabilizing cut banks and fills and improving road surfaces can reduce sediment significantly (Burroughs et al., 1983, Foltz, RB and MA Truebe, 1995, Kochenderfer JN and JD Helvey, 1987, Seyedbagheri, 1996). Improving ditch drainage, replacing culverts and graveling crossings (see Design Features, Chapter 2) would also reduce sediment on many of the open roads.

h. Effects of Sediment Yield on Fisheries

Increases in sediment delivery can affect fish habitat by filling the interstitial spaces in spawning gravels. This results in decreased water flow through the gravels that is imperative for oxygen delivery to incubating eggs and for waste removal. Filling of interstitial spaces can also displace macroinvertebrates, thereby reducing an important food source for fishes. High amounts of sediment can fill in pools and reduce rearing habitat for juvenile fishes.

Alternatives 2, 3, and 4: Risk of sediment delivery to live streams would be reduced in the following ways:

- Since all ground disturbing activities would occur outside of RHCAs, the risk of any sediment generated by logging activities actually reaching a live channel is very low (Belt et al., 1992).
- By using timing restrictions, onsite direction, and BMPs, sediment delivery to occupied fish habitat associated with culvert removals and upgrades would be minimized.

- The higher gradient channel types present in Mission and Brush Creeks would likely carry any sediment to the nearest low gradient area where it would settle out and eventually be transported through the system during high flow events.
- Similarly, sands and gravels would be deposited on gravel bars or other energy reducing features.
- Risk of sediment delivery would be immediately reduced from culvert upgrades and removals and the sediment levels would trend back toward baseline in the long term with any action alternative.

4.5-B. Water Yield modeled by WATSED

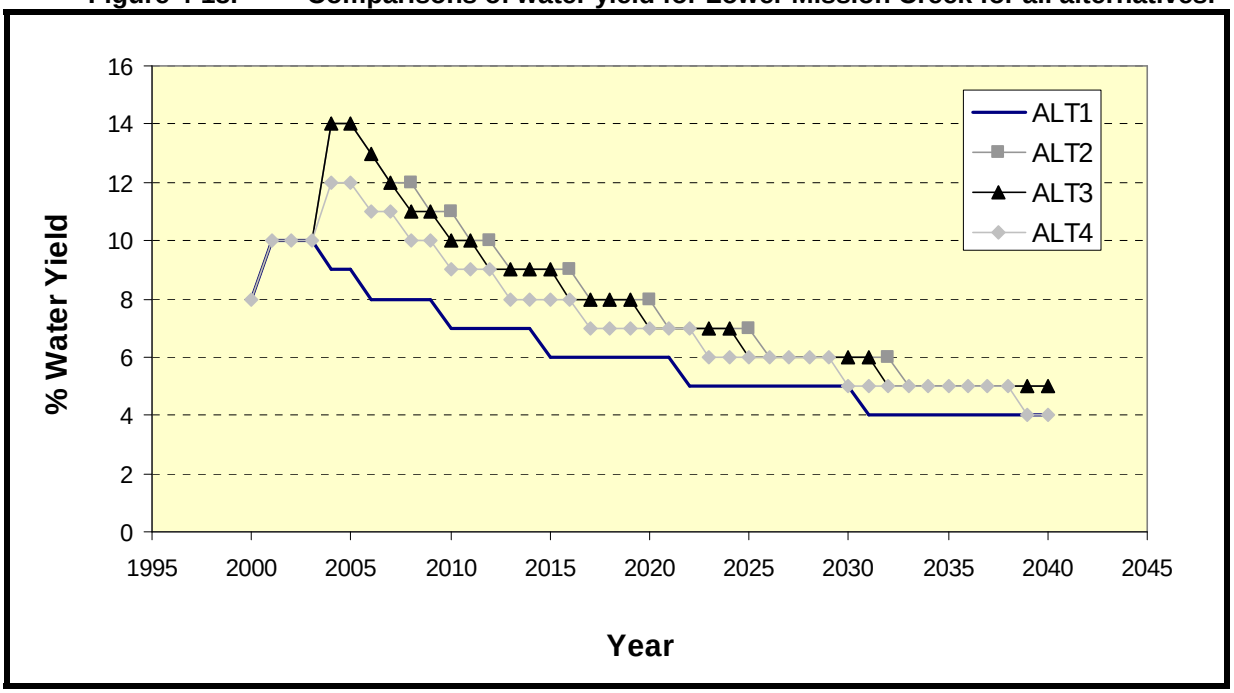
Decreased vegetative cover can result in increased runoff and increased sediment production, especially if roads capture this increased water yield, creating potential for saturated soils and mass failures on unstable road systems. Studies have shown that for these increased water yields to be measurable, over 30% of the entire basin would have to be cut (Troendle, C.A. and RM King, 1985 and 1987).

A maximum of 13% percent of the Mission Creek drainage would be treated with various cutting prescriptions in this project. In the Lower Mission Creek Watershed, where 80% of the proposed treatments would occur, the estimated differences in water yield increases between the three action alternatives is 2% or less.

Alternatives 2 and 3 both increase peak flows to 14 percent, a 5 percent increase over existing conditions.
Alternative 4 increases water yield to 12 percent, a 3 percent increase (watershed project file).

Estimated changes in water yield values in Lower Mission for the three alternatives during and after project implementation are displayed in the following chart.

Figure 4-18. Comparisons of water yield for Lower Mission Creek for all alternatives.



Alternatives 2, 3, and 4: are predicted to have the following effects:

- Increases in water yield for all three action alternatives. The maximum historic increase was estimated at 17 percent (Chapter 3 - Affected Environment), which is 3 percent higher than the increase seen in Alternative 2.
- Also, all three alternatives are within the conditions that the drainages evolved with when comparing the difference in the rise of water yield from the existing condition.
- During the harvest activity that occurred in Canada in 1948, the water yields increased from 2 percent to 17 percent, a 15 percent increase. The largest spike would be with Alternative 2, which has a 5 percent increase over existing condition, less than half the 15 percent increase that occurred in 1948.

Since any change in water yield associated with this project would likely be undetectable in Mission Creek, additional bedload scour during high flows would not be expected.

a. Changes in Stream Channel Morphology

Changes in the magnitude, intensity, or duration of peak flows and sediment yields have the potential to change stream channel characteristics. Stream channels that are primarily alluvial systems (sediment deposited and formed) are the most susceptible to stream bank erosion, changes in sediment supplies, and large woody debris removal (Chamberlin et al 1991, Rosgen 1996). Stream channels where the substrate is composed of bedrock and boulders that have a good portion of large woody debris jams and are more confined within the valley bottom, are more stable with respect to fluctuations in flow and sediment yields (Chamberlin et al 1991, Rosgen 1996).

Alternatives 2, 3, and 4: Based on the stream channel and landtype characteristics of Mission Creek and its tributaries (see Chapter 2, Reference Conditions), none of the alternatives would exacerbate any of the following items:

- estimated changes in peak flows,
- estimated changes in sediment yields,
- the potential increases in flows from a rain-on-snow event, and
- changes in stream channel morphology .

Effects in Brush Lake Area

Alternatives 2 and 4 propose the same harvest treatments. Approximately 506 acres would be harvested and 221 acres would be burned. Ground based equipment would be used to harvest approximately 75% of the proposed acres. Design features to reduce the potential for soil disturbance and sediment production will be followed (see Chapter 2, Design Features to Protect Soil and Site Productivity). The area to be burned is located in the upper portions of the basin away from any stream channel. Three miles of temporary road would be constructed and decommissioned after use in these two alternatives, and 3 miles of road encroaching on the wetlands north of Brush Lake would be obliterated. In the long term, the sediment contribution to the aquatic ecosystem from the obliterated roads would be negligible as the road prism regenerates.

Alternative 3 would harvest 268 acres. 132 acres will be logged by helicopter, which would decrease the potential for sediment production when compared to Alternatives 2 and 4. No temporary roads would be constructed. Three miles of road encroaching on the wetlands north of Brush Lake would be decommissioned and 0.8 miles of road south of Brush Lake would be decommissioned.

Alternatives 2, 3, and 4: No activities would occur on sensitive landtypes in any of the three action alternatives. Any increases in water yield from this project would be difficult to measure for the following reasons:
1) the soils, landtypes and landforms within the basin attenuate increases in water yield through ground water recharge, and surface detention and storage. The topography is not highly dissected and the slopes are mostly gentle with an even or convex profile that does not concentrate water, and
2) flow through Brush Creek is controlled partially by the dam.

b. Effects of water yield on fisheries (Mission and Brush Creeks)

Since any change in water yield associated with this project would likely be undetectable in Mission or Brush Creeks, additional bedload scour during high flows would not be expected.

Redds existing in the cumulative effects area would not be affected by the expected undetectable increase in water yield.

B.2- Direct and Indirect Effects Common to All Action Alternatives (2, 3, 4)

Hall Mountain Area

a. Mass Failure Potential

All landtypes with high mass failure potential on the west slope of Hall Mountain were buffered as required by INFISH (Chapter 2). The Hall Mountain area does contain some treatments on sensitive landtypes, approximately 34 acres in portions of Units 27 and 32. The landtype is categorized as sensitive because it has high sediment delivery potential and moderate mass failure potential. Treatments on these landtypes will be limited to helicopter yarding for the steep portions with no soil disturbance predicted (see Chapter 2, Features Designed to Protect Soil, Water and Fish Habitat).

Helicopter logging during the summer months is appropriate on this landtype because of the limited ground disturbance that is created and because soils are not saturated (project file).

Treatment Units 27 and 32 are an improvement cut and commercial thin. Sediment delivery from these units is considered negligible for the following reasons:

- these units are going to be helicopter logged, and
- there would be no logging within the RHCAs.

Cacek 1989 determined that clearcut logging on sensitive landtypes within the Lightning Creek watershed only accounted for 1.4 percent of the mass failures. The dominant cause of the mass failures and resulting sedimentation to Lightning Creek was from abandoned road networks.

Past landslide failures observed on the west face of Hall Mountain occurred both in draws and not in draw areas. The areas in draws are buffered by INFISH requirements, so the estimated probabilities of failure for areas not in draws were used to determine acceptable harvest levels.

The LISA model was used to estimate the probability of failure for harvest activities ranging between 50% and 100% vegetation removal on different slopes. 100% stem removal conditions were modeled to determine the susceptibility of the slope to failure under a "worst case scenario." *The 100% stem removal is greater than any harvest treatment proposed in this project and the modeled results were not used to evaluate effects.* The results of the LISA runs showed that under average soil moisture conditions, a low probability of failure existed when 50% of the area was cut; but with 100% stem removal, the probability of failure was very high.

Probabilities of failure were also estimated during "event conditions". High soil saturation levels, and lower soil cohesion values were used to mimic soil conditions that would most likely exist during a rain-on-snow event such as the one that occurred during 1997. Under these conditions, slopes between 55 and 60% showed a low potential for failure when 50% stem removal occurred. This was an increased probability of failure over natural conditions (see project file). On slopes greater than 60%, the probability of failure increased over the estimated natural probabilities when only 20% stem removal was modeled.

Therefore, harvest prescriptions on slopes greater than 60% were limited to 20% stem removal; and on slopes between 55 and 60%, harvest was limited to no more than 50% stem removal. This limitation was applied to all alternatives. Potential for sediment delivery by landslides is greatly reduced by restricting harvest intensities in areas with a potential for landslides.

<u>Alternatives 2, 3, and 4</u>: There is no predicted increase of landslide risk on the west facing slopes of Hall Mountain due to harvest activities for any of the action alternatives due to the following features:

- Harvest prescriptions were limited to 20% stem removal on slopes greater than 60%, and
- Prescriptions were limited to no more than 50% stem removal on slopes between 55 and 60%.

Decommissioning the specified 0.5 miles of road on the 2217-C spur would improve slope hydrology and minimize potential for failure in area of past failures.

b. Effects to Peak Flows from Rain-On-Snow Events

Rapid melt during rain-on-snow events can result in high rates of water input to the soil, increasing pore water pressures. Studies show that most landslides and channel erosion occurs during high flows from rain-on-snow events (Harr, R.D. 1986). Approximately 800 acres of treatment in the Hall Mountain area are located within the rain-on-snow zone. As discussed above, the LISA model was used to assess the risk of landslides during "event" conditions, such as a rain-on-snow event, and harvest prescriptions were designed to minimize this risk. Approximately 256 acres would leave about 20% canopy cover and the remaining approximately 544 acres would leave 30-40% canopy cover (Tables in Chapter 2 provide detailed information on

harvest prescriptions). This would reduce the impacts of a rain-on-snow event. Additionally, all landtypes with high mass failure potential on the west slope of Hall Mountain were buffered as required by INFISH (See Design Criteria, Chapter 2).

Mission Creek Area

In this watershed, a maximum of approximately 1,426 acres of treatment are located in the rain-on-snow zone. This is only 9% of the total Mission Creek watershed. Of this, about 595 acres would leave 70% canopy cover, about 232 acres would leave on average 50% canopy cover, and about 691 acres would leave approximately 20-30% cover. The amount of cover left in these areas would reduce the impacts of a rain-on-snow event. Therefore, any increased water yield during a rain-on-snow event would be difficult to attribute to harvest activities. Additionally, design criteria (see Chapter 2) and INFISH buffers would attenuate the effects of runoff during a rain-on-snow event.

Mission Creek drainage lacks the sensitive landtypes found in the Hall Mountain area and does not show evidence of landslides from extreme events.

Brush Lake Area

Approximately 538 acres of treatment, or 11% of the Brush Lake area, falls within the rain-on-snow zone. No activities would occur on sensitive landtypes in any of the three action alternatives. Due to the landtypes and topography found in the Brush Lake area, increased water yield during a rain-on-snow event would be difficult to measure or to attribute to harvest activities (see Direct Effects section).

4.5-C. Cumulative Effects Analysis Area

The cumulative effects analysis area is defined as the combination of the following:

- the Brush Lake area,
- the West Hall Mountain Area, and
- the Mission Creek watershed.

The 21.7 square mile analysis area is the next scale larger than the project area that would exhibit any cumulative effects if they were to occur from the project (Chapter 3; Figure 3-31). Any measurable changes in water or sediment yields that may occur due to proposed management activities are not expected to affect the Kootenai River, in part because of the following:

- The Mission Creek drainage is less than 20% of the Kootenai watershed above Bonners Ferry.
- Additionally, human modifications to the Kootenai River, such as dikes, ditches, and channelization of Mission Creek make it difficult to identify potential effects from the proposed project within the Kootenai River.

C.1- Brush Lake Recreation Proposal – Effects Common to Alternatives 2, 3, and 4

a. Aquatics Direct and Indirect Effects

Improving the existing surface of Road 1004 would reduce the potential sediment production from the road (see Effects of Road Improvement on Sediment Delivery, Chapter 4). Using existing trails and roads and designating specific roads for ATV use would not increase the potential for erosion since road and trail densities would not increase. Improvements to skid trails designated for use as ATV trails would include water barring, or cross draining the trail, as necessary to reduce the risk of erosion. Limiting the number of roads open to ATVs may decrease motorized use in areas at higher risk for erosion. The restoration of non-system cutoff paths, roads and campsites may also reduce the risk of erosion.

The construction activities associated with the construction of new toilets and larger parking areas would increase sediment supply in the short term. However, utilizing construction BMPs would reduce or eliminate the risk of erosion and sediment delivery to Brush Lake or Brush Creek during the construction phase. Restoration of disturbed areas would reduce the risk of erosion as the area recovers.

The installation of a new standard design concrete boat ramp in the same location as the current boat ramp would not have any adverse direct or indirect effects on Brush Lake. This activity would be an improvement to existing infrastructure and would not increase disturbance to the shoreline or lake itself.

The construction of a new 40-foot fishing dock in an area adjacent to the old dock would disturb a new portion of the lake shoreline, but this disturbance would be minimal and will be mitigated by restoring the shoreline at the location of the old dock once it is removed.

b. Aquatics Cumulative Effects

Improving recreational facilities, including designating certain trails for specific uses, often results in a decrease in impacts to an area. Any increase in the use of the Brush Lake area due to the recreation improvements is predicted to be small. Controlling ATV use in the Brush Lake area will become especially important after harvest activities since cross-country motorized use may increase after vegetation is removed (see Recreation – Environmental Consequences, Chapter 4). If use is not controlled and trail densities increase, the potential for sediment production and delivery may also increase due to soil compaction and erosion. Designating specific trails for ATV use may help reduce this potential impact.

Any short-term increase in erosion from construction activities associated with the proposed improvements can be mitigated with Best Management Practices. No long-term adverse effects to Brush Lake or Brush Creek are expected from the proposed recreation improvements in the Brush Lake Area.

c. Fisheries Direct, Indirect and Cumulative Effects

Direct, indirect, and cumulative effects would have *no effect* on white sturgeon and bull trout, since sturgeon are not present outside the mainstem Kootenai River and bull trout are not known to inhabit the cumulative effects area.

The potential short-term increase in sediment associated with the ground disturbing activities at Brush Lake campground may impact westslope cutthroat trout individuals, but will not likely result in a trend toward federal listing or reduced viability for the species. In the long-term, the restoration activities are expected to benefit individuals by revegetating disturbed sites within the RHCA and reducing sediment delivery from these sites.

C.2- Past, Present and Reasonably Foreseeable Actions

The following is a description of past, present and reasonably foreseeable actions, to establish the appropriate geographic and time boundaries for the cumulative effects analysis. Activities identified below were ones that are relevant to the watershed and fisheries cumulative effects analysis. Other activities listed in Chapter 1 are not discussed here because there is no soil or watershed disturbance created by these activities. These include tree planting, firewood gathering, hunting, and helispot maintenance.

Past Activities and Events

<u>Mining</u>

Mining activities have occurred within the Brush Lake area (American Girl Mine and Bethlehem Mine), and in the Hall Mountain area (Montgomery Mine). During the operation of the mines, numerous roads were constructed increasing road densities. These roads were built prior to development of BMPs. None of the mines are located near any perennial streams. The mines were assessed by the Idaho Geological Survey in 2000.

No direct effects of the mining on slope hydrology or stream health were identified (project file).

<u>Wildfires, timber harvest and road building on Forest Service and private lands and within the Project Area</u>

Wildfires, timber harvesting and road construction activities have occurred throughout the watershed, both in the United States and Canada. For the Mission Creek watershed, all three events were used in the WATSED model to determine the current baseline condition and to look at historic ranges of variability. This is discussed in the affected environment section (Chapter 3) of this document.

<u>Reforestation Activities: native seeding and timber stand improvement (tree thinning and pruning in plantations)</u>

These activities help move the watershed toward recovery. These post treatment activities were used in the WATSED model to determine the current baseline condition and to look at historic ranges of variability. This is discussed in the affected environment section (Chapter 3) of this document.

US Highway 95 Realignment

US Highway 95 realignment began in the summer of 2003 and was substantially finished in the spring of 2005, prior to the implementation of this project. This activity was included in the WATSED modeling to determine the existing condition and to look at historic ranges of variability (see Aquatics Existing Condition section) and is incorporated into the discussion of the WATSED results.

Current Management and Ongoing Activities

Even if no activities were being proposed under the Mission Brush project, certain management would continue in the area because of past decisions and current land management policies. Such activities that may be considered as appropriate in the cumulative effects analysis include the following items:

Noxious Weeds Monitoring and Treatment - This activity would follow guidelines established in the Bonners Ferry Noxious Weeds Control Project EIS (USDA 1998c). Effects to aquatic resources were analyzed in that document and its adaptive strategy. No additional effects to watershed or fisheries are expected to occur.

Timber Stand Improvement - This activity would occur outside riparian habitat conservation areas except potentially where it would improve riparian habitat. No ground disturbance would occur and timing restrictions would be enacted. No detrimental direct or indirect effects to watershed and fisheries are expected to occur.

Recreation - Various activities including hiking, motorized recreation on designated trails, horseback riding, fishing, camping, driving, berry picking, snowmobiling, and cross country skiing are enjoyed in the project area.

Brush Lake Area is a frequently used recreation area and would likely see an increase in recreational vehicle use. Since motorized use is not as restricted as other areas on the district, motorcycles, ATVs and snowmobile use is increasing. This has forced additional needs in road and trail maintenance and development (see Recreation section). The lack of road and trail maintenance causes increases in erosion and sediment delivery. Currently, road and trail maintenance has been reasonable in the analysis area and have addressed the immediate concerns with erosion and sediment delivery.

Activities on private lands within the assessment area, such as continued use of agricultural lands, residential development, forest lands management, and mining claim activities. Mining claims are established for American Girl, Bethlehem, and Montgomery (which is presently considered an active claim.) (These activities were considered in the WATSED analysis) See Chapters 1, 2, and 3 for additional information concerning activities on private lands.

Mining in the Hall Mountain and Brush Lake area – American Girl Mine and Bethlehem Mine (Brush Lake area) are not currently active. No direct, indirect or cumulative effects from mining in the Brush Lake area are expected to occur. Montgomery Mine in the Hall Mountain area is currently active. The current owner has discussed road improvements and road building on his mining claim. The mining itself would occur underground. The only effect from this activity would be increased road densities if new roads are constructed. Maintenance activities typically improve drainage and decrease erosion from water channeling down the road surface.

Other types of Activities on Private Lands - Private land consists of 45% percent of the Mission Brush project area in the Mission Creek watershed. These private lands include private homes and farms, but the majority of the land is held by private logging companies. Many of the roads used for logging activities on private lands have increased and concentrated water flows, increased the potential for landslides and delivered sediment to Mission Creek from road fill failures and road surface runoff. Sediment delivery levels from these private roads depend on the level of road maintenance that takes place. Unmaintained roads on the west facing slope of Hall Mountain on private land will continue to intercept and concentrate water and therefore continue to maintain and possibly increase the risk of mass failures in that area. The other portions of private lands are the abandoned and active mine claims and parcels scattered on the lower slopes of Hall Mountain and in the Brush Lake Area. The impacts of those activities are discussed in the Mining section above.

County road maintenance and standard levels of maintenance on Forest Service roads and trails.
Road maintenance activities occur annually to some degree within the watershed. These activities include, but are not limited to, blading, brushing, and culvert cleaning. Maintenance activities typically improve drainage and decrease erosion from water channeling down the road surface. Culvert cleaning and associated maintenance lowers the associated risk of failure.

Suppression of human-caused fire starts and wildfires under jurisdiction of the U.S. Forest Service or State of Idaho Department of Lands
Fire suppression activities over the last century within the project area have allowed stands to progress towards climax vegetative condition. No major fire has occurred in the project area since 1948. 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). Since changes in water yield are associated with vegetation conditions, the existing and future trends would have an effect on water yield.

Vegetation treatments and other activities of the Rock Pine and Harebrush Timber Sales that were previously analyzed in the Rock Bottom EA and Decision Notice
Activities occurring within the Rock Pine and Harebrush Timber Sales were analyzed in the Rock Bottom EA.

Approximately 232 acres of treatment in the Rock Pine timber sale are located within the Brush Lake area. About 157 acres are an irregular shelterwood that will treat off-site ponderosa pine; 75 acres will be a roundwood thinning. The Rock Pine timber sale, adjacent to the Brush Creek watershed, has been completed and the contract has closed.

Approximately 180 acres of the Harebrush timber sale are located within the Brush Lake area. The units are a commercial thin and will be tractor logged. The Harebrush sale is approximately 70% finished at this time; termination date for the contract is December 31, 2006.

No additional effects to watershed or fisheries are expected to occur.

Reasonably Foreseeable Activities

Fire Suppression
Fire suppression activities within the project area will continue to allow stands to progress towards climax vegetation conditions with an increase in mortality and available fuel where stands are not treated.

Timber harvest on private lands (see Appendix A for additional information)
Effects from the timber harvest and planting activities that recently occurred in 2005 on Forest Capital lands were integrated in to the watershed analysis in the FEIS (see project file). Timber harvest on private lands must follow the rules and Best Management Practices set by the Idaho Forest Practices Act (Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code). These rules and BMPs are designed to prevent sediment delivery to stream channels and to prevent any cumulative watershed effects.

The current and recent harvest activities on private lands are not anticipated to have any cumulative effects to watershed resources and aquatics. Effects of associated road use and road building during harvest activities on private land is discussed above.

Development of a Forest Service seed orchard, approximately 15 acres in size, within proposed treatment unit 134 on the eastern side of Hall Mountain.

A 15-acre clearcut to establish a seed orchard is planned within Unit 134 (approximately 20% of the treatment unit). No increased effect on sediment yield or water yield is expected from this level of activity within the proposed shelterwood cut.

C.3- Cumulative Effects to Aquatics – All Action Alternatives

a. Watershed and Erosional Processes – Mission Creek Watershed

Sediment Yield, Water Yield and increased Peak Flows from Rain-on-Snow Events

The combination of direct and indirect effects of the proposed alternatives with past, present and reasonably foreseeable activities, will not result in any cumulative effects to the Mission Creek Watershed. Estimated sediment and water increases are determined to be within the historic range of variation from past activities. Plus, the small incremental increases that were estimated are considered non-measurable based on natural system fluctuations. Also, with the decommissioning of 7 miles of road and storage of 4.5 miles of road within the watershed, this would help improve watershed conditions.

In the event of a rain-on-snow event, peak flow increases would not cause any cumulative effects to Mission Creek. These events are natural processes that occur episodically in time and space. Vegetation prescriptions would trend vegetation towards conditions and patterns which would be similar to those formed by past disturbance events. Treatment units are only a small percentage of the watershed (at most 11% in the Brush Lake area) and the hydrologic openings created by the treatment would be less than that and would not increase the effects of a rain-on-snow event (see Direct Effects section).

b. Stream Channel Morphology – Mission Creek Watershed

Mission Creek is a dynamic system that would continue to be subject to bank erosion and channel migration during high flows. Since the estimated increases in peak flows associated with all three action alternatives are within the historic range of variation, *there would not be any cumulative effects to changes in stream channel morphology*. The estimated short-term increases in sediment yield associated with this project and the road decommissioning are expected to be routed through the stream channel and would not be of a magnitude that would cause changes to stream channel morphology (e.g., migration, braiding, and widening of channels). *Long term reductions in sediment yield associated with approximately 12 miles of road decommissioning will also improve stream channel conditions in the Mission Creek drainage*.

Overall, Mission Creek channel morphology would be maintained or improved since known sediment sources from Road FSR-272 would be removed. This includes the road resurfacing work, cutbank stabilization and cross drainage improvement. The decommissioning of approximately 7 miles of road in the East Fork drainage of Mission Creek would restore natural slope hydrology and reduce the risk of failure caused by poor road drainage.

c. Cumulative Effects - Brush Lake Area

The harvest activities associated with the Harebrush and the recently completed Rock Pine timber sale are not expected to cause any cumulative effects in the Brush Lake area. These sales were assessed in the Rock Bottom EA (district files), and determined this activity would cause no detrimental direct, indirect or cumulative effects to water yield and sediment yield. Given the design, type magnitude and location of these sales *there would be no cumulative effects to water yield or sediment yield in any of the three action alternatives*.

In the event of a rain-on-snow event, peak flow increases would not cause any cumulative effects to Brush Creek. These events are natural processes that occur episodically in time and space. Vegetation prescriptions would trend vegetation towards conditions and patterns which would be similar to those formed by past disturbance events.

d. Mass Failure Risk – Hall Mountain Area

As discussed previously in this section, the LISA model was used to assess the risk of landslides on the west face of Hall mountain during "event" conditions, such as a rain-on-snow event. To mitigate the risk of mass failure, harvest prescriptions were modified to leave higher canopy retentions on the steeper slopes and use zero ground disturbance skidding techniques such as helicopter yarding. As a result, there is no predicted increase of landslide risk on the west facing slopes of Hall Mountain as a result of harvest activities for any of the action alternatives.

Additionally, the 0.5 miles of road on the 2217-C spur that would be decommissioned with an action alternative would improve slope hydrology and minimize potential for failure in the vicinity of past failures. All landtypes with high mass failure potential on the west slope of Hall Mountain were buffered as required by INFISH (See Design Criteria, Chapter 2).

C.4- Cumulative Effects to Fisheries

The Mission Brush project, in conjunction with reasonably foreseeable actions, would result in a short-term increase in sediment, but an overall reduction in sediment risk in the long-term. Based on the direct and indirect effects discussed above, the risk of any sediment delivery from harvest activities actually reaching a live channel is very low because of BMPs and INFISH buffers. The modeled short-term increase in sediment yield directly associated with the Mission Brush project is very small compared to the overall reduction in sediment yield and risk of sediment delivery resulting from the culvert upgrades.

The potential short-term increase in sediment associated with culvert upgrades may impact individual westslope cutthroat trout and torrent sculpin, if present, but would not lead toward a trend in federal listing. In the long term, the reduction in sediment yield is expected to benefit survival of individuals.

Similarly, cumulative effects from the project and reasonably foreseeable actions may affect, but are not likely to adversely affect, federally listed bull trout, and are expected to benefit individual survival in the long term. Any increases in water yield would be localized and would not be measurable in fish-bearing channels.

4.5-D. Consistency with the Forest Plan and Other Regulations

Specific requirements and how this project meets them are discussed below and listed in Appendix B. Alternative A would not change riparian habitat conditions, except for a steady increase in the risk of a stand replacement fire over time and the potential for road drainage failures from high risk culverts. The alternatives also meet the requirements for fisheries resources in the Forest Plan, as amended by the Inland Native Fish Strategy.

D.1- IPNF Forest Plan

All alternatives meet the requirements of the IPNF Forest Plan for water resources and fisheries.

D.2- Changes between the 2004 FEIS/ROD and the Supplemental FEIS

On June 2, 2005, the Forest Supervisor for the Idaho Panhandle National Forests signed a Decision Notice and Finding of No Significant Impact that amended the Forest Plan to modify or remove objectives, standards, and monitoring requirements pertaining to fry emergence success (IPNF 2005).

The amendment was implemented because the fry emergence objectives, standards and monitoring requirements that were in the IPNF Forest Plan did not contribute as well as INFISH objectives, standards, guidelines, and monitoring direction towards meeting the goals of providing sufficient habitat in support of maintaining diverse and viable populations of fish species across the forest.

In addition, because of the limited application of the fry emergence models and their unreliability, and the inability to determine fry emergence success in the field due to high variability affected by multiple natural and human-caused factors, the Forest Service was not be able to state with any degree of certainty whether measures of fry emergence success were accurate or precise. (IPNF 2005. Fry Emergence Amendment Decision Notice and Finding of No Significant Impact. 70 pages.)

D.3- Endangered Species Act (Fisheries)

All alternatives meet requirements of the Endangered Species Act. The project will have no effect on the endangered white sturgeon, white sturgeon critical habitat, or the threatened bull trout, and would not jeopardize their continued existence. Critical habitat has not been designated for bull trout (see Appendix B.)

D.4- National Forests Management Act – Species Viability

Fish species that may be affected by the project (westslope cutthroat trout, rainbow trout) are also distributed across the Forest. For example, bull trout and rainbow trout are found in eight of 13 (61%) of 4th code HUC watersheds (i.e., large watersheds, such as Pend Oreille Lake) on the IPNF. Cutthroat trout currently occur in 100% of 4th code watersheds on the Forest. There is no connectivity between the Kootenai River watershed, which includes Mission Creek, and nine of the other 4th code HUC watersheds on the Forest (e.g., Pend Oreille Lake, St. Joe River).

At the smaller watershed scale (e.g., Mission Creek, a 6th code HUC watershed), bull trout are known to inhabit approximately 5% of the watersheds in the Kootenai River drainage, while westslope cutthroat trout and rainbow trout occur in approximately 100%.

Based on the distribution of species across the Forest, the lack of connectivity between large watersheds, and the limited cumulative effects area (i.e., effects are limited to the Mission Creek watershed), the Mission Brush Project will not affect viability of any threatened, endangered, sensitive, or MIS fish species on the IPNF.

D.5- Clean Water Act, including State of Idaho

All alternatives would be consistent with the requirements of the Clean Water Act, 33 U.S.C. §1251. Brush Creek and Mission Creek and its tributary Zion Creek, and Hall Creek are now listed for temperature on the approved 2002 TMDL list (Dave

Mosier, Idaho DEQ Final 303-d list, 2003; P.F. document STRM-05 including IDEQ's news release dated 1/1/706). The requirements of the INFS amendment to the 1987 IPNF Forest Plan, as well as other specific design features of this project would prevent or mitigate any activity that could potentially increase stream temperatures (see Chapter 2). In addition, based on no cumulative effects to fisheries and their habitats within all streams in the project area, beneficial uses will be maintained.

D.6- Idaho Forest Practices Act

Best Management Practices or Soil and Water Conservation Practices would be applied under all alternatives, and all activities are in compliance with the guidelines in the Soil and Water Conservation Handbook.

D.7- Executive Order 12962

All alternatives are consistent with this executive order regarding aquatic systems and recreational fisheries. Short-term effects of this project may affect westslope cutthroat trout individuals but would not lead toward a trend in federal listing. Long-term effects (i.e., net reduction in sediment) are expected to benefit westslope cutthroat trout survival and habitat.

D.8- State of Idaho Governor's Bull Trout Plan

All alternatives are consistent with the direction in the Governor's Bull Trout Plan. Long-term effects are expected to benefit bull trout and their habitat.

4.6 Wildlife

Introduction

This section displays and discusses the effects on those wildlife species identified in Chapter 3 that may be affected by the proposed actions. Effects discussions include direct, indirect and cumulative effects, all of which may have positive or negative consequences. Information presented in this section is based on scientific literature, wildlife databases, professional judgment, recent field surveys, and habitat evaluations.

4.6-A. Cumulative Effects Analysis

Past actions and other disturbances have laid the foundation for today's forest vegetation and are depicted/accounted for in the baseline condition descriptions. This is especially true for habitat suitability analyses, which characterizes the changes in vegetation (succession) from past disturbances.

Cumulative effects discussions for alternatives include these past actions in combination with other relevant present, ongoing, and reasonably foreseeable actions, regardless of the source (past, present and reasonably foreseeable actions are described in Chapter 1). The appropriate scale or geographic bounds for cumulative effects analysis relates to an area that would be affected by the proposed action or reasonable alternative. This area is referred to as the cumulative effects analysis area and may vary between resources. Determining this area for wildlife depends upon a species' relative home range size in relation to its available habitat, topographic features that influence how species move and utilize their home range (e.g. watershed boundaries), and boundaries that represent the point of diminishing potential effects (see the following Tables).

Lynx Analysis Units (LAU) were delineated following standards outlined within the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). LAUs were not depicted to replicate actual lynx home ranges, but their scale approximates the size of area used by an individual lynx. The size of LAUs would generally be from 16,000 to 25,000 acres in contiguous habitat, and likely be larger in less contiguous, poorer quality, or naturally fragmented habitat. The LCAS has determined that the LAU is a suitable cumulative effects analysis area for lynx.

The USFWS and the USFS have identified areas outside recovery zone boundaries known to be currently occupied by grizzly bears. Subsequent to the publication of the Mission Brush DEIS, the Kootenai, Idaho Panhandle, and Lolo National Forests have issued a Record of Decision (ROD) for the Forest Plan Amendments regarding motorized access in the Selkirk and Cabinet-Yaak Recovery Zones (USDA 2004). This document gives official status to the occupied area in the north central portion of the Bonners Ferry Ranger District (referred to in the ROD as the "Deer Ridge Occupancy Area"). USFWS has identified the Deer Ridge Occupancy Area as a suitable cumulative effects analysis area for grizzly bears – akin to Grizzly Bear Management Units (BMUs) within Recovery Zones (Bryon Holt, pers. comm. 2004).

For most of the species analyzed, the cumulative effects analysis area is defined as the portion of the project area within the IPNF Administrative Boundary. This area totals approximately 18,310 acres, is the size of multiple home ranges for even highly mobile species such as goshawks, and provides adequate habitat to sustain the complete life cycle of non-migratory wildlife as well as breeding/nesting habitat for migrants. The eastern and southern boundaries of the project area are drawn along natural topographic divisions, such as watersheds. The western and northern extents of the cumulative effects area are drawn along the IPNF administrative boundary and the International border, respectively. The western project boundary roughly corresponds to point at which the Purcell Range meets the valley floor (Purcell Trench), where the mountainous forested environment abruptly gives way to gently sloping cropland, human development and large natural openings.

In the Project Area, there are also several thousand acres of privately-owned lands within the IPNF Administrative Boundary, including three square miles belonging to Forest Capital Partners, Ltd. (FCP). Private lands in the Round Prairie area occupy a broad, generally treeless valley, and subsequently offer little habitat for forest-dwelling wildlife. Other ownerships – particularly FCP lands – are managed for the primary purpose of resource (timber) extraction. Since these timber stands are managed on relatively short rotations, they are usually precluded from reaching suitable habitat conditions for species that require mature forest structure. As a result, these ownerships are highly susceptible to adverse habitat modifications, and the presence of suitable habitat cannot be relied upon over time. Through aerial photograph interpretation, the District can determine how many acres are currently forested, and roughly estimate overstory canopy cover on these properties. However, determining habitat suitability for species analyzed using this limited information would be a dubious endeavor. Important structural habitat components such as tree diameter, number of canopy layers, and presence of snags and down woody material would not be discernable from aerial photos. The cost of obtaining this information through field reviews of these properties would be exorbitant and of limited value, given their propensity toward irretrievable habitat alterations. Therefore, while adjacent private lands both outside of and within the IPNF Administrative Boundary may provide suitable habitat for species analyzed, we lack data to adequately assess these areas, and assume that they are providing no habitat for these species.

Table 4-11. Project impact zones for species analyzed.

Species Analyzed	Cumulative Effects Area
Northern gray wolf	Project area within IPNF Administrative Boundary
Canada lynx	Lynx Analysis Unit
Grizzly bear	Deer Ridge Occupancy Area
Black-backed woodpecker	Project area within IPNF Administrative Boundary
Flammulated owl	Project area within IPNF Administrative Boundary
Northern goshawk	Project area within IPNF Administrative Boundary
Fisher	Project area within IPNF Administrative Boundary
Western Toad	Project area within IPNF Administrative Boundary
Pileated woodpecker	Project area within IPNF Administrative Boundary
White-tailed deer	Project area within IPNF Administrative Boundary
Forest land birds	Project area within IPNF Administrative Boundary

Analysis Indicators for Selected Species

The following table displays the issue indicators that are used to measure effects on selected wildlife species and their habitats. Indicators for each species may vary and are based on those factors that could result in measurable adverse or beneficial effects. For most species being analyzed, appropriate habitat parameters were measured to distinguish suitable habitat (specific parameters for individual species are located in the project file). The changes in suitable habitat for each relevant species are disclosed and a discussion of the effects on species is displayed in this Section.

Table 4-12. Issue indicators used to measure effects

Species	Indicator
Northern grey wolf	Increases in vulnerability (road densities), or decreased prey densities.
Canada lynx	Changes to key habitat components (denning, unsuitable)
Grizzly bear	Changes in open and total road densities
Black-backed woodpecker	Changes in distribution and quality of snag habitat
Flammulated owl	Trends in habitat suitability
Northern goshawk	Trends in suitable nesting habitat
Fisher	Changes to habitat suitability

Pileated woodpecker	Changes to large snag habitat and old growth habitat
Western Toad	Quality of wetlands and terrestrial habitats
White-tailed deer	Changes to critical mid-winter range
Forest land birds	Changes to priority habitats and vegetative diversity

4.6-B. Threatened and Endangered Species

a. Northern Gray Wolf

Methodology

The potential effects on gray wolf were determined by predicting changes in vulnerability (measured by road density changes) and prey availability from the proposed actions.

Alternative 1

Without access management, open road density in the Hall-Mission area would remain at its current high level. Artificial openings that are presently supporting high prey densities will close in as forest succession advances. In the absence of fire, gray wolf habitat would probably decline in this area.

Effects Common to Alternatives 2, 3 and 4

Development of a system of motorized trails would, on paper, increase motorized route miles. However, the old skid roads to be converted to trails are already being used for this purpose. As a result, the proposed recreation enhancements should concentrate motorized recreation in a smaller area than is currently being utilized. Winter use of the area would not be substantially increased, so this feature of the proposed action is unlikely to affect prey populations. Since this proposal would not increase motorized access to previously inaccessible areas, there would be no increased mortality risk. Upgrade of other recreational facilities may increase recreational use (numbers of people) of the area, but would not increase the size of the recreational footprint (area used). As a result, effects of this increased use are unlikely to have considerable impacts on gray wolves or prey species.

Alternative 2

Direct and Indirect Effects

The Brush Lake area (project area south of Highway 95) generally is heavily roaded and receives considerable human use. Any potential den locations in this area are likely to be on the slopes of Tungsten or Bethlehem mountains, east of the project area. While big game may be displaced by logging and other project activities, these animals will generally recolonize treated areas relatively quickly once activities cease.

Most (2,813 acres) of the proposed timber harvest would take place in the Hall Mountain/Mission Creek portion of the project area (north of Highway 95), including about 1,683 acres of selective harvest and 1,130 acres of regeneration harvest. The long-term effect of timber harvest and prescribed burning would be an increase in quality and quantity of big game forage in treated areas. There would be a loss of hiding cover, particularly in regenerated areas. However, assuming the selectively harvested areas would still offer some degree of hiding cover, almost 75% of USFS-administered lands in this portion of the project area would continue to provide hiding cover after harvest. As a result, this project would likely create a net benefit to big game species, and, consequently, to wolves.

Timber harvest and associated fuels treatments may represent a substantial source of disturbance to gray wolves and their prey, but this impact would be likely be confined to a few years in any given area, after which use would resume. Approximately 1,300 acres of timber harvest would be by helicopter, most of which is on the inaccessible west face of Hall Mountain. Not coincidentally, there is a possibility that this area could accommodate den and/or rendezvous sites. Helicopter use has a higher potential to affect wolves from a greater distance than other harvest activities, since it is audible from farther away.

Currently, it is unclear to what extent a wolf pack is using the Mission Brush project area. As additional information becomes available, the appropriate conservation requirements will be applied (see *Design Criteria*, Chapter 2). There is a possibility that a resident pack could be disturbed at den or rendezvous sites by project activities; however, this event is a low order of probability for several reasons. Because of the high amount of current human use in the Brush Lake area and the potential

travel impediment (Highway 95) between this area and where the wolf group was observed in December, it is unlikely that this area would be utilized for anything more than occasional foraging. Proposed units in the Mission Creek drainage are within an area of recurring grizzly bear use (Deer Ridge Occupancy Area), where project activities are currently restricted from April 1-June14.

The west face of Hall Mountain is the most likely location of potential wolf dens in the project area. Timber harvest in this area would not begin before 2007. It is assumed that IDFG and/or USFWS will make a concerted effort to ascertain the degree of wolf use of the area during the 2006 field season, including possible radio-collaring of individual wolves if this is determined to be a resident pack. Once individual pack members are collared, the information gained will lend itself to a better understanding of habitat use of this particular pack, along with the location of den and rendezvous sites. This information would be used to determine spatial and temporal restrictions on sale activities – presumably prior to initiation of project activities in this area.

Alternative 3

Direct and Indirect Effects

Proposed timber harvest in the Hall-Mission area under Alternative 3 would be virtually identical to that proposed for Alternative 2. As a result, project-related disturbance and big game forage creation/cover reduction would be equal in these alternatives. The main difference between the two in this portion of the project area is that Alternative 3 would decommission about two fewer road miles (Road 2211). Alternative 3 also contains substantially fewer acres of timber harvest in the Brush Lake area than Alternative 2. However, for reasons discussed above, this change would likely have minor impacts on wolves with the exception of reduced available forage for prey species in Alternative 3.

Alternative 4

Direct and Indirect Effects

Alternative 4 would impact almost 800 fewer acres in the Hall-Mission area than Alternative 2, although the units on the west face of Hall Mountain (prospective den location) would remain. This alternative would also do less to reduce road density in this area, since Road 221 would not be treated. Effects in the Brush Lake area would be the same as for Alternative 2.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for gray wolf:

Past Activities and Events – Timber harvest in the project area during the last 60-70 years likely had little disturbance effect on gray wolves, since it is doubtful they occupied the area during most of this time. The longer term effects of some of the more recent regeneration harvests, as well as the large clearcutting done in the late 60s through late 70s, is the reduction of forest cover and increase of big game forage.

Current Management Activities – Personal use firewood gathering, non-motorized recreation, winter motorized recreation and standard road maintenance would not significantly impact gray wolves since none of these activities would elevate road densities. Continued fire suppression would help retain forest cover, further contributing to reduction of big game foraging habitat. Off-road motorized recreation can displace wolves or their prey from preferred habitat, particularly recurrent use in a particular area. Development of an ORV trail system near Brush Lake should partially offset this effect by concentrating motorized use away from areas where wolves are more likely to den.

Other Restoration Projects – Thinning young, small diameter trees would be designed to increase the overall health and vigor of the stands. Since this activity would originate from open roads, it may cause a minor disturbance to gray wolves during implementation, but would have no long-term effects. Similarly, noxious weed treatments and underburning would take place along roads and other disturbed areas, and would have a minor disturbance effect on gray wolves or their prey.

Future Harvest Activities - The Mission Brush project is bordered to the east by the Northern Prairie project area. In the proposed action for the Northern Prairie project, 1.2 miles of bermed road would be opened for project implementation, and an additional 0.3 miles of temporary road would be built. As with the Mission Brush project, use of these roads would be restricted to the sale operator and subcontractors through the use of a temporary gate or other barrier. Once all harvest and post-sale activities are completed, berms on these roads would be reconstructed to prevent vehicular access. The Northern

Prairie project also proposes decommissioning of 5.4 miles of currently open road, and an additional 3.1 miles of undrivable roads. The end result would be a decrease in wolf vulnerability as a result of reduced vehicular access. Similar to the Mission Brush project, this project would create openings in the forest canopy that would likely increase big game forage quality and quantity, while reducing available hiding cover.

Activities on other ownerships – Forest Capitol Partners, LTD (FCP) manages nearly four square miles of forestland in the Hall Mountain/Mission Creek area. These lands are managed for wood fiber production, and subsequently contain relatively few acres of mature, dense forest. Since this pattern is expected to continue in the future, FCP lands will provide ample big game forage but relatively little hiding cover in the project area.

Other private lands west of Hall Mountain and in Round Prairie will continue to experience development, logging and small-scale livestock production. These activities may somewhat constrain the amount of habitat available to a resident wolf pack, on both a temporary (logging) and permanent (home building) basis. Livestock production may pose a special risk of conflict with this wolf pack. It is unknown at this time whether the calf adjacent to the project area was actually killed by these animals or merely opportunistically fed upon by them. Either way, the presence of livestock could indirectly result in wolf mortality in the future.

The Idaho Department of Transportation will soon improve the segment of Highway 95 that traverses Round Prairie. This highway experiences relatively large volumes of high-speed traffic through much of the day, and will likely experience larger volumes of even faster traffic once the highway improvement project is complete. This increased speed/volume of traffic may pose a barrier to travel or result in direct wolf mortality in the future.

Conclusion

The most important criteria for wolf management are maintenance of an abundant prey base and minimizing the risk of illegal mortality. It is unlikely that the Mission Brush Project will increase the vulnerability of wolves or influence their ability to use these areas. Prey availability is expected to increase and mortality risk to decrease as a result of this action. According to USFWS, successful wolf recovery in the northern Rocky Mountains does not depend on land-use restrictions - with the possible exception of temporary restrictions around active den sites on federally managed lands - due to the ability of gray wolves to thrive under a variety of land uses (USDI 2003). For these reasons, the Mission Brush project may affect, but is not likely to adversely affect gray wolves or their habitat.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed under the Endangered Species Act (USDA 1987 p. II-6). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

b. Canada Lynx

Methodology

Canada lynx habitat was evaluated using a habitat suitability model derived from data in the Forest timber stand database (TSMRS). Modeling rules and assumptions can also be found in the project file. Since we lack adequate vegetation data on surrounding private lands, it is assumed that these lands make no contribution to lynx habitat, even though there may be suitable patches within these ownerships. In addition, the LCAS directs that lynx habitat components be evaluated on the basis of percentages of Federal land capable of providing lynx habitat within a LAU.

Based upon research findings, capable lynx habitat is grouped in the following broad categories:

- Unsuitable: capable lynx habitat that has, through natural or artificial processes, lost vegetation of sufficient height to provide forage and cover for snowshoe hare populations through a winter of average snow depth.
- High Quality Forage: includes dense stands of regenerating conifers – both with (late successional forage) and without (early successional forage) the presence of mature overstory canopy – that provide adequate forage and cover to support snowshoe hare populations during a winter of average snow depth.
- Denning: mature conifer stands that contain a nearly continuous overstory canopy (>70%) and enough coarse woody debris of structural complexity to provide denning opportunities for a female lynx rearing kittens.
- Low Quality Forage: this catch-all category encompasses those stands that do not fit into other categories, but are within capable habitat and contain sufficient vegetation to be considered suitable. These stands may supply the occasional

denning or foraging opportunity, or merely contribute forested habitat through which lynx can travel with a sense of security.

The Hall-Mission Lynx Analysis Unit (LAU) contains 9,957 acres of capable lynx habitat within 357 delineated stands. USFS personnel field verified 229 stands totaling approximately 5,402 acres, or 54% of total lynx habitat (ref: "Mission Brush Canada Lynx habitat field validation" notes – project file). In the end, the model underestimated denning habitat in field-validated stands by approximately 203 acres and unsuitable habitat by 57 acres.

Lynx habitat component data was corrected to include data gathered in field reviews. As a result, unsuitable habitat increased to 961 acres, and denning habitat increased to 2,839 acres (29% of capable habitat). Existing condition for the Hall-Mission LAU, and potential effects of alternatives on select habitat components, are summarized in Tables 7 and 8.

To determine if denning habitat is "well-distributed", LAUs are divided by subwatersheds for analysis purposes. In this case, the Mission Creek watershed occupies 62% of the Hall-Mission LAU, and over 90% of the LAU that falls into the project area. Within this watershed, percentages of habitat components closely reflect those of the entire LAU, so denning is assumed to be adequately distributed.

Table 4-13. Effects of proposed activities on habitat indicators for the Hall-Mission LAU.

Alternative	**Denning** (Acres)	**Denning** (%)	**Unsuitable** (Acres)	**Unsuitable** (%)	**Change Last Decade** (Ac.)	**Change Last Decade** (%)
Existing Condition (Alternative 1)	2,839	28.5	961	9.6	276	2.8
Alternative 2	2,532	25.4	1,951	19.6	1,266	12.7
Alternative 3	2,575	25.9	1,878	18.9	1,193	12.0
Alternative 4	2,652	26.6	1,016	10.2	331	3.3

Table 4-14. Effects of proposed activities on lynx habitat components for the Hall-Mission LAU.

Lynx Habitat	**Existing Condition (Alt 1)**	**Alt 2**	**Alt 3**	**Alt 4**
High quality forage acres				
Early successional	1,090	1,090	1,090	1,090
Late successional	696	696	696	696
Low quality forage acres	4,370	3,736	3,717	4,502
Denning acres (% of capable)	2,839 (28.5)	2,532 (25.4)	2,575 (25.9)	2,652 (26.6)
Unsuitable acres (% of capable)	961 (9.7)	1,903 (19.1)	1,878 (18.9)	1,016 (10.2)
Increase in unsuitable in 10-year period (% of capable)	276 (2.8)	1,266 (12.7)	1,193 (12.0)	331 (3.3)

The potential effects on Canada lynx and its habitat were determined by predicting the change to habitat components that would result from each alternative.

Alternative 1

In the absence of mechanical treatments, habitat conditions would continue to change in this LAU. There would be a continued shift toward more shade tolerant species, and small stem density and understory congestion would continue to build up in most stands. Insects, disease and competition for sunlight and nutrients would hasten tree mortality and trigger increases

in down woody material. More lynx denning habitat would be produced, and existing denning habitat would be enhanced. However, high quality foraging areas, most of which are over 30 years old, will begin to lose their value as preferred hare habitat. While a number of more recent harvest units will begin to develop into high quality forage habitat, these are relatively small areas that collectively include less than 10% of the LAU, and over time would not replace the amount of foraging areas lost. As a result, while lynx would enjoy improved denning opportunities with this alternative, the population density of their principal prey species may well decline past the point where lynx occupation of the area is viable.

The scenario described above assumes that there would be no stand-replacing fire in this area. Given the history of active fire suppression, existing high fuel loads in most stands, and increased fuel concentration that lack of management action would provide, it is reasonably certain to assume that the area will be affected by wildfire at some point in the future. The magnitude of this fire would depend upon area accessibility, available resources, weather and other environmental factors. A mixed-severity fire would not likely alter large portions of available habitat, but a large stand-replacing fire would convert denning stands to unsuitable habitat, which would take 20-30 years to mature to the point where they would support high densities of snowshoe hares.

Effects Common to Alternatives 2, 3 and 4

Since the Hall-Mission LAU is somewhat isolated from other lynx habitat on the District, several connectivity corridors have been identified on the east and west sides of this LAU. In addition to protecting aquatic species, safeguarding riparian areas through application of INFISH standards will also preserve important lynx travel corridors leading into this LAU. The proposed recreational developments in the Brush Lake area would not affect Canada lynx, since this activity would take place outside any Lynx Analysis Units (LAUs). As stated in the DEIS (p. 4-49), these improvements would not result in any increase of over-snow vehicle use in the area.

Alternative 2

Direct and Indirect Effects

This alternative proposes treatments on 1,410 acres of currently suitable lynx habitat, which would affect 307 acres of lynx denning habitat (Table 4). Most (179) of these acres are dominated by cedar/hemlock (Unit 48), which would not be as highly preferred for denning as spruce/fir- or lodgepole pine-dominated stands. Several stands dominated by these preferred species are also proposed for treatment (Units 38, 41 and 33), but with the exception of Unit 41, these stands do not provide ideal den sites because they are not proximal to high quality forage. Regeneration harvest of Unit 41 would remove 30 acres of potential denning and no high quality (late successional) forage. The area in and around this proposed unit may have importance to Canada lynx because of the desirable arrangement of habitat components and the fact that it is in the northwest (unroaded) portion of the LAU.

These alternatives will regenerate approximately 990 acres within lynx habitat, providing recruitment foraging stands for the future. Besides the potential denning acres discussed above, proposed regeneration units include mainly low quality forage areas. These areas provide occasional foraging opportunities, and may also presently contain denning structure or develop this structure over time. However, given the apparent surplus of denning habitat in the area and the fact that these stands supply only marginal denning and foraging habitat, regeneration of these stands to provide for future high quality forage would probably be more beneficial to Canada lynx.

Alternative 3

Direct and Indirect Effects

This alternative would treat 1,316 acres of currently suitable lynx habitat, including 264 acres of modeled denning habitat (Table 4). As in Alternative 2, this number includes 179 acres of cedar/hemlock dominated stands. Since Unit 41 has been dropped from this alternative, the remaining acres of proposed treatment in modeled denning involve subalpine fir or lodgepole dominated stands not in close proximity to high quality forage.

The reduction of 73 acres of regeneration harvest in this alternative would convert 917 acres to an unsuitable condition, 802 acres of which are classified as low quality foraging habitat.

Alternative 4

Direct and Indirect Effects

This alternative would treat only 473 acres of suitable lynx habitat, since most units within capable lynx habitat have been dropped (Table 7). Unit 48 would still be harvested, including the 179 acres of less than ideal denning habitat within this unit. This alternative would only regenerate 55 acres, all in low quality forage habitat. The immediate impacts of this alternative on lynx would be considerably reduced from those of Alternatives 2 and 3 since it would treat significantly less area. However, the long-term effects of Alternative 4 would be to produce much less high quality forage than the other action alternatives.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for Canada lynx:

Past Activities and Events – While all past timber harvest in the Mission Creek area likely had some impact on lynx, only a few of these shaped vegetation to the degree that their effects are still observable on the landscape. The 96 Tiers, West Mission Gillon and EBGB timber sales created a series of smaller openings and corridors that likely, or will in the future, provide high quality hare habitat. The Mission Harvey, Mission 30, and other unnamed sales from the late 60s through late 70s created the much larger openings that continue to provide high quality hare habitat in the Zion and East Fork Mission creek drainages. These harvests almost certainly reduced the amount of available denning habitat. However, there is an ample supply of denning within this LAU, and in the absence of wildfire, these harvests probably resulted in a long-term improvement of lynx habitat. The road construction associated with these sales increased access for trappers and snowmobilers, potentially causing negative impacts to lynx through increased trapping mortality and snow compaction allowing access to lynx habitat for competing predators. However, motorized use of these roads during summer had a relatively minor impact, since lynx are not normally displaced by human presence. These activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Personal use firewood gathering, non-motorized recreation, and standard road maintenance would not significantly impact Canada lynx. Continued fire suppression would keep denning habitat intact, but also has the potential to retard development of early successional hare habitat since fewer acres would be allowed to burn. As a result, continued fire suppression would offset the impacts of this proposal to some degree. Off-road motorized recreation would have minor impacts to lynx during the summer months, since low population densities of lynx and the preference of these recreationists for more open areas make it unlikely ORV use would occur in the same general vicinity as lynx at the same time. Oversnow motorized use has the potential to negatively impact lynx, but the lack of groomed routes and designated play areas, along with the steep terrain and high incidence of dense forest cover, limits snowmobile use within lynx habitat in the project area.

Other Restoration Projects – Silvicultural treatments of regenerating stands, including white pine pruning, weed and release, and shrub control projects, may be implemented under the restrictions set forth during informal consultation between USFS and USFWS regarding ongoing activities and existing projects within lynx habitat on the IPNF. Since these treatments would have only minor effects on high quality foraging habitat, there would be no significant cumulative effects when considered collectively with the proposed action. Similarly, noxious weed treatments would take place along roads and other disturbed areas, and would cause inconsiderable changes in vegetative structure with respect to snowshoe hare habitat. Future underburning is unlikely to impact Canada lynx since this would take place in low elevation dry forest stands that do not supply lynx habitat.

Future Harvest Activities - In combination with past natural and human-caused events, the proposed action and the adjacent Northern Prairie sale will not alter lynx habitat conditions in such a way that they fail to meet the standards set forth in the LCAS. The results of Mission Brush alternatives, along with the Proposed Action for the Northern Prairie Project, on the Hall-Mission LAU are as follows:

Table 4-15. Combined effects of Mission Brush alternatives and Northern Prairie proposed action on lynx habitat indicators for the Hall-Mission LAU.

Alternative	**Denning** (Acres)	**Denning** (%)	**Unsuitable** (Acres)	**Unsuitable** (%)	**Change Last Decade** (Ac.)	**Change Last Decade** (%)
Alternative 1	2,611	26.2	1,162	11.7	477	4.8
Alternative 2	2,304	23.1	2,152	21.6	1,467	14.7
Alternative 3	2,347	23.6	2,079	20.9	1,394	14.0
Alternative 4	2,424	24.3	1,217	12.2	532	5.3

(Note: Alternative 1 is the Existing Condition)

Activities on other ownerships – Timber harvest or other activities on non-USFS ownerships may provide a source of disturbance or adversely modify habitat that lynx are currently utilizing to some degree. However, the LCAS directs that lynx habitat components be evaluated on the basis of percentages of Federal land capable of providing lynx habitat within a LAU. Since non-Federal ownerships are assumed not to provide lynx habitat, activities on these ownerships would not affect reported percentages of lynx habitat components. As a result, there would be no cumulative effects on Canada lynx as a result of activities on other (non-USFS) ownerships in the project area.

Conclusion

Alternatives 2 and 3 would have some impact to existing habitat, including the loss of modeled denning habitat. At the same time, these alternatives would provide recruitment stands for future high quality snowshoe hare habitat. Alternative 4 would have a smaller immediate effect on lynx habitat, but would produce less high quality forage over time. Lynx habitat conditions would meet the standards set forth in the LCAS in all alternatives. While harvest activities may provide a temporary disturbance to resident lynx, there is a low probability that this disturbance would result in lynx mortality. There will be no increase of open road miles in lynx habitat as a result of this action. The proposed action may affect, but is not likely to adversely affect, Canada lynx or its habitat.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed under the Endangered Species Act (USDA 1987 p. II-6) and would meet LCAS guidelines. Numeric standards applicable to lynx habitat are: 1) no more than 30 percent of lynx habitat can be in an unsuitable condition, and 2) at least ten percent of lynx habitat should be maintained in denning condition. Approximately 1,742 acres of lynx habitat have been regeneration harvested in this LAU since 1960, and there have been no large, stand-replacing fires in this area since the 1930s. If all of regenerated acres still remained in unsuitable condition today (highly unlikely), the combination of this and the 990 acres of proposed Mission Brush regeneration harvest would bring the amount of unsuitable habitat to 27 percent – still well under the 30 percent allowed. With respect to denning habitat, 2002 field surveys of only 54% of lynx habitat in the LAU verified 1,703 acres of denning habitat. Thus, even if this habitat component was completely absent from the remaining 46% of the LAU, the denning standard would still be met (Alternative 2 proposes to treat only 307 acres of suitable denning habitat, leaving at least 14% of habitat in the LAU in denning condition).

c. Grizzly Bear

Methodology

Since the Mission Brush area is outside the designated grizzly bear recovery zone, there are no numeric standards for core habitat, TMRD or OMRD. However, because the northern end of the project area is within a recurring use area, the direction is to manage this area for improved habitat conditions for bears. Specifically, motorized access will be controlled so that there will be no net increase in open or total drivable linear route density as a result of projects on federal land.

In March, 2004, the USFS issued the ROD for the Forest Plan Amendments regarding motorized access in the Selkirk and Cabinet-Yaak Recovery Zones (USDA 2004), which codified the previous management emphasis of no net increase of open or total road densities in the Deer Ridge Occupancy Area. Since the Mission Brush project was designed to tier to this document in advance, there is no need to modify alternatives to be compliant with the new Forest direction.

At present, the IPNF does not have a vegetation-based grizzly bear habitat suitability model, so possible changes to vegetation will be addressed qualitatively. Road densities are reported as linear miles of open and total roads per square mile in the bear use area. While there are several seasonally restricted roads within this area, most of these roads are only restricted during the big game hunting season, so from the standpoint of grizzly bear habitat they are effectively "open".

Alternative 1

Without access management, open road density in the occupied grizzly bear area would remain at its current high level. Artificial openings that are presently providing forage will close in as forest succession advances. In the absence of fire, grizzly bear habitat would probably decline in this area.

Effects Common to Alternatives 2, 3 and 4

The proposed recreational developments in the Brush Lake area would not affect grizzly bear, since this activity would take place outside any Grizzly Bear Management Units (BMUs) and the Deer Ridge Occupancy Area. Conversely, improvements at Brush Lake Campground would presumably have a net benefit to grizzly bears by easing recreational pressure within surrounding BMUs and the Deer Ridge Occupancy Area. Providing ATV users with a designated trail network may reduce ATV use of system roads within BMUs and the illegal cross-country riding that sometimes accompanies this use. Also, providing group picnic and group camping areas fulfills a need not previously addressed by the District. Presently, family reunions, weddings, and other group gatherings are often held at Boulder Meadows or at Baker Camp in the Smith Creek drainage – areas that provide important grizzly bear habitat. Shifting a significant amount of this use to the Brush Lake area should help ease displacement of resident bears and reduce potential human/bear encounters, particularly in the late spring and early summer. The reconstruction of Trail 409 discussed in the DEIS was addressed by the District in a separate action (DM signed 1/13/04), so the effects of this trail become part of the existing condition for wildlife species, and the action was withdrawn from the Mission Brush proposal.

Alternative 2

Direct and Indirect Effects

Alternative 2 proposes brushing of 0.55 miles of currently undrivable road (Road 2481H), which would temporarily raise the road density in the affected area from 3.32 miles/mile^2 to 3.34 miles/mile2. When post-harvest road decommissioning is completed, total road density would be reduced to 2.8 miles/mile^2. Access on this road would be restricted to the purchaser and subcontractors through the use of a temporary gate or other barrier, so there would be no changes in open road density. After timber harvest and post-harvest activities are completed, this road would be placed in storage (bermed and culverts removed). An additional 5.3 miles of currently open road would be closed (decommissioned or stored) as a result of this proposal, as well as some 11.7 miles of undrivable roads. When post-harvest decommissioning activities are completed, total road density in the Deer Ridge Occupancy Area would be reduced to 3.20 miles/mile^2, and open road density would be 2.98 miles/mile^2.

This alternative proposes timber harvest of 1,333 acres within the bear use area. Prohibiting off-road mechanical activities during spring would reduce potential disturbance to grizzly bears. If winter logging is utilized, disturbance would be negligible. The proposal calls for girdling on 74 acres of existing seedtree units that may have forage value for grizzly bears. The remaining acres are forested stands with 70% or more overstory canopy cover. While these stands may provide cover, they probably have a lesser forage value to bears. Regeneration harvest of 889 acres of currently forested habitat should enhance future foraging opportunities for bears.

Alternative 3

Direct and Indirect Effects

Road densities during harvest would be identical to those calculated for Alternative 2. Since Road 2211 would not be utilized as a haul route, this road would not be put into storage after activities are complete. As a result, post-sale total road density would be 3.20 miles/mile^2, and open road density for this alternative would be 2.98 miles/mile^2. Alternative 3 would treat

1,186 acres within the bear use area, 816 acres of which would be regenerated. Seasonal restrictions would be the same as for Alternative 2.

Alternative 4

Direct and Indirect Effects

Open road density during project implementation would not increase over current conditions, because units behind Road 2481H would be dropped. When post-harvest road decommissioning is completed, total road density would be 3.20 miles/mile^2, and open road density would be 2.98 miles/mile^2.

Timber harvest in this alternative would affect 548 acres within the bear use area, 74 acres of which would be girdling existing seedtree units. This alternative represents considerably less disturbance to bears since less area is affected and the harvest units are concentrated on the south end of the analysis area. Like the other action alternatives, there will be minimum disturbance to grizzly bears if these units are winter logged.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for grizzly bears:

Past Activities and Events – It is unknown to what extent past timber harvest impacted grizzly bears in the short term (during implementation), since it is likely that grizzly bear occupancy of this area is a relatively recent (10-15 years) occurrence (grizzly bears were absent from or at very low densities in the US Selkirk and Purcell ranges at the time of Federal listing in 1975). The longer term effects of some of the more recent regeneration harvests, as well as the large clearcutting done in the late 60s through late 70s, is the reduction of forest cover and increase of foraging habitat. The road construction associated with these harvests likely degraded grizzly habitat effectiveness, although bears have apparently acclimated to elevated road densities in this area, as evidenced by continued occupation. These activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Personal use firewood gathering, non-motorized recreation, winter motorized recreation and standard road maintenance would not significantly impact grizzly bears since none of these activities would elevate road densities. Continued fire suppression would help retain forest cover, further contributing to reduction of foraging habitat. Off-road motorized recreation can displace bears from preferred habitat, particularly recurrent use in a particular area. Development of an ORV trail system outside grizzly habitat should partially offset this effect by concentrating motorized use away from areas of grizzly occupancy.

Other Restoration Projects – Thinning young, small diameter trees would be designed to increase the overall health and vigor of the stands. This activity would originate from open roads, or would not exceed administrative use guidelines on restricted roads. While thinning may cause a minor disturbance to grizzly bears during implementation, there would be no long-term effects. Similarly, noxious weed treatments and underburning would take place along roads and other disturbed areas, and would have a minor disturbance effect on grizzly bears.

Future Harvest Activities - The Deer Ridge Occupancy Area includes portions of both the Mission Brush and Northern Prairie project areas. In the proposed action for the Northern Prairie project, 1.2 miles of bermed road would be opened for project implementation, and an additional 0.3 miles of temporary road would be built. As with the Mission Brush project, use of these roads would be restricted to the sale operator and subcontractors through the use of a temporary gate or other barrier. Once all harvest and post-sale activities are completed, berms on these roads would be reconstructed to prevent vehicular access. The Northern Prairie project also proposes decommissioning of 5.4 miles of currently open road, and an additional 3.1 miles of undriveable roads.

Potentially, implementation of Mission Brush Alternatives 2 or 3, along with the Northern Prairie project, could temporarily raise total road density in the Deer Ridge Occupancy Area to 3.37 miles/mile^2 (since Mission Brush Alternative 4 does not propose opening currently undriveable roads, there would cumulatively be no additional effects with the Northern Prairie project during implementation). Because newly opened roads would be gated and the additional road miles would not be available for travel by the general public, there would be no increase in open road density during implementation of either project. Once activities are completed in both projects, total road density would be 3.08 miles/mile^2, while open road density would be reduced to 2.86 miles/mile^2 in all action alternatives.

Activities on other ownerships – Forest Capital Partners (FCP) owns approximately 2.5 square miles within the DROA. The USFS is currently unaware of any planned activities on private (FCP) lands within the analysis area. Since the majority of FCP lands within the DROA are already relatively heavily roaded, any future activities would probably emanate from existing roads.

Conclusion

Alternatives 2, 3 and 4 may temporarily disturb grizzly bears if these activities take place during the bear activity season. However, these alternatives may also enhance foraging opportunities in the future. There will be no permanent increase of road miles in the bear analysis area as a result of this action. The proposed action may affect, but is not likely to adversely affect, grizzly bear or its habitat.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed under the Endangered Species Act (USDA 1987 p. II-6). All action alternatives are consistent with the Kootenai, Idaho Panhandle, and Lolo National Forests Land and Resource Management Plans Amendment for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones (USDA 2004) direction for management of grizzly bear habitat in identified occupied areas outside Recovery Zones.

4.6-C. Sensitive Species

a. Black-backed woodpecker

Methodology

The potential effects of management activities on black-backed woodpeckers were determined by the change in habitat conditions that would result by implementing the alternatives. Specific parameters analyzed for this assessment include the changes in distribution and quality of snag habitat. Snag availability was estimated by modeling USFS-managed property covered with pole-sized or larger timber that has not had any harvest or other major disturbance for at least 20 years and is more than 50 m from a drivable road prism. In all likelihood, this approach conservatively estimates snag availability in several ways: 1) Not all snags near drivable roads will be taken by woodcutters, particularly smaller-diameter snags often utilized by black-backed woodpeckers. In addition, currently restricted roads are assumed to provide access to woodcutters in the event these roads will be opened during the snow-free season, although this is a relatively rare occurrence in the Project Area. 2) The analysis assumes no snags are retained in timber harvest units, despite implementation of minimum snag retention guidelines since at least 1987 (IPNF Forest Plan adoption). 3) As discussed below, other ownerships probably provide at least some level of available snag habitat, although the model assumes no habitat contribution from these ownerships. While there is no assurance that areas that meet the model criteria have high snag densities, given the increasing rate of tree mortality due to insects and disease, it is reasonable to assume that there are small pockets of mortality scattered throughout the project area that are providing suitable black-backed woodpecker habitat.

Alternative 1

No immediate changes in snag habitat would occur as a result of implementing this alternative. Habitat conditions would change according to natural events over time. As a healthy forest matures, some trees die from competition and other natural forces, resulting in higher quality and quantity of snags. Consequently, nesting and foraging habitat would be improved for snag dependent species in healthy, low risk stands.

In the high risk stands, the prevalence of root disease and insect damage would be expected to spread in this alternative, resulting in higher levels of tree mortality. The dead trees would be replaced by other shade tolerant species, which would be re-infected and die, perpetuating the cycle. This change would slowly and methodically replace such species as ponderosa pine, white pine, and western larch, preventing many stands from reaching mature structures.

Tree mortality would continue to provide an abundance of nesting and foraging habitat for some species. Because black-backed woodpeckers are nearly restricted to post-fire habitat, their populations would remain at low endemic levels. However, high fuel accumulations resulting from elevated tree densities would lead to a higher risk of fires, increasing the chance of stand-replacing fires. If a stand-replacing fire were to occur, it would create a temporary flush of habitat for black-backed

woodpeckers.

Effects Common to Alternatives 2, 3 and 4

The proposed recreational developments in the Brush Lake area would have insignificant effects on black-backed woodpeckers, since this species is not particularly sensitive to human disturbance and snag densities would not be substantially reduced by this feature of the proposed action.

Alternative 2

Direct and Indirect Effects -Tree cutting would affect approximately 3,201 acres that contain some form of snag habitat in Alternative 2. In the long-term (> 80-100 years), this alternative would increase the occurrence of quality snags (longer lived, seral tree species such as western white pine, western larch and ponderosa pine) by converting 1,926 acres of species at high risk of insect and disease (i.e. Douglas-fir and grand fir) to more resilient, longer-lived species. However, this alternative represents an overall decrease in snags, as tree cutting may remove small snags and subsequent stand conditions would result in lower levels of small snag recruitment. In addition, the removal of young Douglas-fir, grand fir, and offsite ponderosa pine and the subsequent open stand conditions would result in reduced susceptibility to disease. Habitat loss due to tree removal would be compensated by snag and live tree replacement where opportunities exist. In addition, prescribed burning is expected to kill a portion of the residual green trees, creating habitat for black-backed woodpeckers.

Approximately 152 acres that contain some form of snag habitat presently consist of offsite ponderosa pine plantations. All but 21 of these acres are proposed regeneration harvest units. Since mortality of offsite ponderosa pine has already begun, these units are currently supplying a relatively high density of small diameter snags. Though many of these snags may be lost through attrition during harvest or post-harvest activities (hazard tree removal, broadcast burning, blowdown, etc.), portions of these units will probably continue to supply sufficient small- and medium-sized snag habitat for black-backed woodpeckers.

While tree cutting would remove many small snags, and subsequent stand conditions would result in lower levels of small snag recruitment, much of the Mission Brush project area would remain unaffected by past and proposed cutting. Areas outside of proposed treatment areas would continue to be susceptible to insect and disease, thereby perpetuating small to medium sized snag habitat for black-backed woodpeckers. Annual aerial surveys of new insect-induced tree mortality across the Bonners Ferry Ranger District conducted by USFS Forest Health Protection personnel have shown that bark beetles infested an average of 4,000 acres per year from 1990-98 across the District (S. Kegley, pers. comm.). This higher rate of infestation and mortality is expected to continue for the next few years mainly due to increasing mountain pine beetle, western balsam bark beetle and fir engraver populations, especially if drier than normal weather conditions continue. Additionally, mortality due to root diseases is not included in aerial survey data and has been steadily increasing. This data indicates that snag and down woody debris recruitment from insects and disease activity from 1990 through 1998 has been occurring at a steady rate of about two to five percent of the District per year and increasing to around six to 22 percent of the District from 1999 to present. Based on the existing and predicted increase in snag levels over the project area, there should continue to be a quantity of snags less than twenty inches dbh that can be considered excess to meet the Northern Region Snag guideline recommended levels.

Alternative 3

Direct and Indirect Effects

Tree cutting would affect approximately 2,733 acres that contain some form of snag habitat in Alternative 3. Approximately 1,633 of these acres represent stands with species at high risk of insect and disease. By eliminating several units in the Brush Lake area (including Unit 129), Alternative 3 would have less of an immediate effect on black-backed woodpeckers, but would result in less quality snag habitat in the long term since fewer high risk acres would be treated.

Alternative 4

Direct and Indirect Effects

Tree cutting would affect approximately 2,387 acres that contain some form of snag habitat. These acres represent vegetation treatments in dry-site stands where there is a greater likelihood that quality snags exist. Treatments would promote the persistence of longer-lived, seral species (e.g. ponderosa pine, western larch), resulting in high value snags in the future. Approximately 1,451 of these acres represent stands with species at high risk of insect and disease.

Snag and live tree replacement measures are designed for these treatment areas to ensure that snags persist at levels and distributions shown to support viable populations of species that use snags and logs (see Features Common to All Action Alternatives, Chapter 2). Snag retention objectives are consistent with recent published data suggesting that populations of cavity nesters were viable in stands of ponderosa pine and mixed conifer forests that contained about four to six snags per acre (Bull et al. 1997). Outside of proposed units, tree mortality in lower risk stands would continue to advance, producing a higher quantity of snags.

Cumulative Effects Common to Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for black-backed woodpeckers:

Past Activities and Events – Timber harvest on USFS lands would have reduced snag densities in logged stands in nearly every instance, particularly prior to adoption of the Forest Plan in 1987 when standards for snag retention were weak or disregarded. The long-term impact of these activities is the reduction of snags of all sizes. In subsequent years, snag retention and snag recruitment (leaving higher densities of green trees for future snags) in harvested areas has improved through implementation of Forest Plan standards and, more recently, adoption of the Northern Region Snag Protocol (USDA 2000). Recently, as discussed above, tree mortality in untreated stands has increased Forest-wide, increasing available black-backed woodpecker habitat as a consequence. As a result, the ultimate legacy of historic logging in the project area is limited to a decrease in *large*-diameter (>20" dbh) snags, since production of smaller snags in untreated areas as well as in harvest units >30 years old due to natural mortality of immature trees from insect and disease infestations has replaced small-diameter snags. These activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Firewood cutting is anticipated to continue along seasonal and yearlong open roads. This activity has the potential to reduce snags within 50 meters of open roads. While there may be minor reductions in miles of open roads as a result of the action alternatives, this would not significantly reduce snag vulnerability to firewood gathering. Black-backed woodpeckers have been described primarily as a post-fire obligate species--a species dependent upon habitat that results from a mixed lethal or stand-replacement fire that produces an abundance of snags. Interrupting the periodic disturbances created by lethal wildfires through continued fire suppression may threaten local populations of black-backed woodpeckers. Conversely, if a wildfire occurs in the project area that could not be suppressed, habitat may be enhanced. Various recreation activities and routine road maintenance are unlikely to have any impacts on black-backed woodpeckers.

Other Restoration Projects – It is unlikely that noxious weed treatments would have any impacts on black-backed woodpeckers. Thinning young, small diameter trees and future underburning would be designed to increase the overall health and vigor of the stands. Since these activities are designed to produce stands with lower densities of larger stems and to reduce tree mortality, they would by definition negatively impact black-backed woodpeckers, which prefer high densities of smaller diameter snags. However, these activities would occur almost exclusively on dry forest types, and are designed to produce stands more representative of historical conditions. Black-backed woodpecker habitat would continue to be produced on many moist forest habitats, as well as some untreated dry forests, in and adjacent to the project area.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations. While snag retention is often low or nonexistent in harvested areas on these ownerships, unharvested areas likely provide at least some level of small snag recruitment due to natural tree mortality.

Conclusion

Although the proposed actions would reduce the quantity of available snag habitat, tree mortality would continue to persist in the analysis area, allowing black-backed woodpeckers to maintain populations at low endemic levels. Samson (2005) concluded that short-term viability of the black-backed woodpecker in the Northern Region and on the IPNF is not an issue because:

- No scientific evidence exists that the black-backed woodpecker is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.

- Increases in amounts of small and mid-size trees have increased since European settlement.
- Well-distributed and abundant black-backed woodpecker habitat exists on today's landscape.
- Level of salvage timber harvest or overall timber harvest of forested landscapes in the Northern Region is insignificant.

Consequently, Alternatives 2, 3 and 4 may impact black-backed woodpeckers or their habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. For these alternatives, black-backed woodpecker populations would remain at reduced densities and their current distribution would be sustained.

Consistency with Forest Plan and Other Regulations

All proposed alternatives would meet and exceed Forest Plan goals and objectives for managing snag habitat (USDA 1987, Appendix X). The Forest Plan calls for managing snags at 40% of the potential capacity throughout Management Area 1 lands. This translates into retaining 8 snags > 20 inches dbh, 82 snags > 12 inches dbh, and 45 snags > 10 inches dbh, per 100 acres or 1.35 snags per acre. Design features for this project calls for retaining at least 4 snags from the largest representative size class on dry habitats and at least 6 snags from the largest representative size class size on the moist habitats.

Also, all action alternatives are consistent with Forest Plan direction 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 1987, p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

b. Flammulated Owl

Methodology

Flammulated owl habitat was evaluated using a habitat suitability model derived from data in the Forest timber stand database (TSMRS). This database was updated to reflect any changes in condition resulting from field walk-through exams (see dry-site stand condition field notes, project file). Modeling rules and assumptions can also be found in the project file. The potential effects on the flammulated owl and its habitat were determined by predicting the change in habitat suitability that would result from each alternative. The following assumptions and/or research findings were used to aid in the assessment of effects:

Flammulated owls are associated with late successional ponderosa pine and Douglas-fir forests. Reynolds and Linkhart (1992) reported that all published North American records of nesting, except one, came from forests in which ponderosa pine was at least present, if not dominant.

The habitat suitability index (HSI) model uses vegetation characteristics to determine if stands are currently suitable flammulated owl nesting/foraging habitat (ref: "Interpretation of IPNF Wildlife Queries" – project file). The habitat capability index (HCI) model identified 204 stands (6,379 acres) within the Mission Brush project area as capable habitat. Between August and October 2002, the wildlife biologist conducted site visits to determine suitability of 85 stands (approximately 3,047 acres) identified as "capable" (ref: "MB Dry Site Stands Field Notes" – project file). In addition, a combination of site visits and aerial photo interpretation (comparing unvisited stands with field-verified stands of similar appearance) was used to determine suitability of the remainder of capable stands.

There were 32 proposed Mission Brush treatment units that contained at least some capable flammulated owl habitat. Site visits were conducted on all but two of these units (Units #10 & 13), and habitat suitability verified. These units were not field reviewed because the forester's data and reconnaissance notes, as well as aerial photo inspection, indicated that these units did not contain structural conditions conducive to flammulated owl occupation. Unit 10 is dominated by a high density of smaller (<12") diameter offsite ponderosa pine and Douglas-fir with high incidence of root rot. The proposed unit experienced stand-replacing fire in the mid-1940s, leaving no large relict pine or larch. With overstory canopy approaching 80%, the stand is not currently suitable habitat. Given the high incidence of root rot and significant component of offsite ponderosa pine, it would be unlikely to develop into suitable habitat without management intervention. The eastern approximately 40% of Unit 13 is a mesic habitat type (not capable habitat), and nearly the entire unit is dominated by small diameter lodgepole pine. Due to the prevalence of lodgepole pine, this unit is also currently unsuitable and unlikely to develop into suitable habitat absent treatment.

Alternative 1

While Alternative 1 would not alter existing vegetation patterns through mechanical means, mortality caused by agents such as root disease and insect "outbreaks" would continue to exert change to habitat conditions. There would be a continued shift toward more shade-tolerant species in the majority of the stands. Forest encroachment that historically would have been held in check by fire would continue to proliferate and crowd out remaining open stands of ponderosa pine and Douglas-fir. Douglas-fir trees would continue to be recycled through disease-prone stands, creating a scenario that would discourage the development of more open, older forests of ponderosa pine and Douglas-fir. Old-growth dry-site forest stands would become increasingly crowded in the understory by shade-tolerant species, causing these stands to trend further from suitable habitat conditions. Consequently, habitat suitability for flammulated owls would decline.

Without management intervention, the dry habitats in the Mission-Brush area would continue to decline. High fuel accumulations resulting from fallen trees would lead to a higher risk of stand-replacing fires. If a stand-replacing fire were to occur, it would take about 100 years for successional processes to restore habitat which would be similar to today's condition due to continued fire suppression and subsequent dominance of shorter-lived, shade-tolerant species.

Effects Common to Alternatives 2, 3 and 4

The proposed recreational developments in the Brush Lake area would have very minor effects on flammulated owl, since no suitable habitat currently exists in the vicinity of planned improvements. While an occasional large snag may be felled for public safety reasons near the campground or boat launch/picnic area, the predominance of generally immature off-site ponderosa pine in this area makes it very unlikely that these snags would be in preferred flammulated owl nest stands.

Alternative 2

Direct and Indirect Effects

Alternative 2 proposes treating approximately 2,326 acres of capable flammulated owl habitat. This would affect 36 percent of the capable habitat within the cumulative effects area, including some 202 acres of suitable habitat. Treatment (burning) of 153 acres of seral brush fields is included in this alternative.

Approximately 1,670 acres of capable habitat would be treated using selective cutting. This technique would remove trees in areas where there is the opportunity to maintain or enhance the growth of ponderosa pine, or move the stands toward desired structural stages. Trees removed would generally be smaller and less dominant in the stand and of species not desired for future species composition. Therefore, treatments associated with selective cutting would tend to move stands toward meeting desired habitat conditions for flammulated owls. A number of stands proposed for selective cutting (approximately 1,000 acres) are not currently suitable due to a dense secondary canopy layer that limits foraging opportunities, yet contain a primary canopy layer of mature ponderosa pine/Douglas-fir. These stands would be directly converted to suitable flammulated owl habitat through selective harvest of a portion of the secondary canopy layer.

Selective cutting units include approximately 190 acres of stands containing currently suitable flammulated owl habitat. However, most of these stands contain large areas of currently unsuitable habitat interspersed with patches of suitable habitat. These units are scheduled for improvement cuts or sanitation salvage, which would target smaller diameter stems of undesirable tree species in areas of the stand not presently providing suitable habitat. The intent is to treat portions that have a dense understory in order to reduce fire hazard and enhance the dry-site old growth character of the stand. Small patches of dense Douglas-fir or grand fir regeneration would be retained throughout the units (see Features Common to All Action Alternatives, Chapter 2).

Several stands that contain patches of currently suitable habitat are adjacent to the Highway 95 right-of-way. Selective harvest would temporarily preclude flammulated owls from using this habitat. However, it is likely that the high amount of disturbance associated with constant high-speed traffic would make these stands less desirable as flammulated owl nesting habitat.

Alternative 2 also proposes treating 503 acres with regeneration harvest prescriptions within flammulated owl capable habitat. Stands with regeneration prescriptions are generally either high-risk stands (stands with a high component of Douglas-fir that are at high risk of mortality), or are dominated by offsite ponderosa pine. Because of the high mortality of Douglas-fir and offsite ponderosa pine, there is the expectation that these stands would lose sufficient forest structure, composition, and/or overstory canopy to produce suitable habitat conditions for flammulated owls. Converting these stands through regeneration cutting methods would alter species composition and favor the longer lived, more disease resistant species like ponderosa pine.

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.

Two units (#15 & 17) propose regeneration harvest in approximately 12 acres of currently suitable flammulated owl habitat. These units encompass stands which have overstory canopy and stem densities on the upper end of what is considered suitable habitat, and would probably move into unsuitable condition within the next decade. While the proposed prescription is "irregular shelterwood", careful marking of these units would result in prescriptions that are analogous to "commercial thinning" units. Application of these types of treatments has resulted in high quality flammulated owl habitat in other sale areas on the district, such as on Dawson Ridge. While there may be a temporary disturbance to flammulated owls during sale activities, dry-site habitats would be improved and maintained over time.

This analysis assumes that active management through regeneration and selective tree cutting can help restore natural processes in an ecological system. Although some stands have lost or are losing sufficient forest structure to maintain habitat suitability, proposed actions would promote the long-term viability of suitable flammulated owl habitat. While some may question whether dry site stands restored to a more open grown state would continue to support species such as flammulated owls that require these conditions, current stand structure in most proposed dry site units is clearly trending away from sustainable habitat conditions recognized as preferred by this species in published literature.

Alternative 3

Direct and Indirect Effects

Elimination of several units within flammulated owl habitat would reduce treatments to 1,785 acres of capable habitat. Treatment prescriptions of remaining units would be the same as for Alternative 2. Units dropped from this alternative include both selective harvest and regeneration prescriptions.

Approximately 1,445 acres of capable habitat will be treated by selective cutting, including 169 acres of stands containing currently suitable habitat. Unit 122 accounts for 157 of these acres, the remaining 12 acres represent mapping errors and a small (two acre) inclusion of suitable habitat in Unit 14. Selective harvest could potentially convert 911 acres of currently unsuitable habitat to a suitable condition. Regeneration harvest will treat 340 acres, none of which is currently suitable or could be directly converted to suitable habitat through treatment. Alternative 3 would cause less temporary disruption of possible suitable habitat than Alternative 2, but would treat fewer acres that could be directly converted to suitable habitat. This alternative would also forgo treatment in several stands that are not likely to achieve suitable habitat conditions without a stand-replacing event.

Alternative 4

Direct and Indirect Effects

This alternative is similar to Alternative 2 with respect to treatment of dry-site forest stands. Acres of treated flammulated owl habitat are virtually identical in Alternatives 2 and 4, the difference being that Unit 66 is left out of Alternative 4. As a result, Alternative 4 would treat approximately 2,306 capable acres (not all of Unit 66 is in capable flammulated owl habitat).

Alternative 4 would also change the prescription of Unit 20 from regeneration harvest to selective harvest – affecting 8 acres of capable flammulated owl habitat. As a result, this alternative would treat 1,678 acres of capable habitat using selective cutting, including 204 acres of stands containing currently suitable habitat. Alternative 4 also proposes treating 475 acres with regeneration harvest prescriptions within flammulated owl capable habitat. Effects of these proposed treatments would be similar to those described for Alternative 2. Ultimately, Alternative 4 would trend a comparable number of acres toward desired conditions as Alternatives 2.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for flammulated owls:

Past Activities and Events – USFS timber harvest of flammulated owl habitat on the west face of Hall Mountain has historically been restrained by limited road access on this steep, rocky area. Timber sales from the past 30 years (Montgomery Mine, Brush Lake, Along Hall, and Helitier) concentrated on dense stands of Douglas-fir, while harvest of mature ponderosa pine last took place in unnamed sales of the 1950s. While all had the potential to reduce densities of large snags, only the older

sales would have measurably reduced suitable flammulated owl habitat. Most of the stands around Brush Lake were heavily impacted by stand-replacing fire in the 1940s, and subsequently have not been heavily logged. Most of these stands have not reached sufficient size and structure to provide flammulated owl habitat. There has been some recent and historical logging of the slope east of Deer Park that escaped the Brush Lake fire, including the Helirockter and Rock Bottom sales. Similar to activities on Hall Mountain, recent sales focused on overstocked Douglas-fir stands, while historic logging included large diameter ponderosa pine. In general, older sales reduced suitable flammulated owl habitat, while more recent sales targeted habitat that was not currently suitable and, in most cases, *changed the trajectory of these stands toward suitable conditions*. In combination with past natural and human-caused events, the total effect of these alternatives would help restore natural processes by favoring tree species composition and structures that are consistent with historic vegetative patterns of dry site ecosystems. While some stands have lost or are losing sufficient forest structure to achieve habitat suitability, proposed actions would lead to long-term stability of habitat for flammulated owls by promoting more open grown stands of ponderosa pine and Douglas-fir and creating opportunities for managing stands with fire in the future. Past activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Firewood cutting is anticipated to continue along seasonal and yearlong open roads. This activity has the potential to reduce large snags within 50 meters of open roads. While there may be minor reductions in miles of open roads as a result of the action alternatives, this would not significantly reduce snag vulnerability to firewood gathering. Interrupting the periodic disturbances created by lethal wildfires through continued fire suppression probably has mixed impacts on flammulated owls. Wildfire usually reverts stands back to an earlier successional stage. In some cases this would interrupt immature stands from reaching habitat suitability, and in other cases would regenerate stands with high densities of small stems that may never reach suitability lacking disturbance. Regardless, fire suppression through the years has heavily contributed to reduction of open grown ponderosa pine stands by preventing periodic underburns in these stands. Since this activity is expected to continue, the results would be partially compensated for by activities described in this proposal. Various recreation activities and routine road maintenance are unlikely to have any impacts on flammulated owls.

Other Restoration Projects – It is unlikely that noxious weed treatments would have any impacts on flammulated owls. Thinning young, small diameter trees and future underburning would be designed to increase the overall health and vigor of the stands. Additionally, thinning and underburning would improve species composition and structure, resulting in stands that are more ecologically stable in the face of potential disturbances. Consequently, thinning and underburning actions would promote long-term stability of habitat conditions for flammulated owls.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Conclusion

The analysis area encompasses 18,359 acres. Of these acres, 6,408 acres (35 percent of the analysis area) are classified as capable habitat for the flammulated owl. Currently, there are only about 364 acres (6 percent of the capable habitat) that currently meet suitable habitat conditions. The lack of suitable habitat is due to the combination of relatively young stands, and older stands that have a dense secondary canopy layer that can prohibit foraging by flammulated owls. The majority of the 364 acres of currently suitable habitat in the project area have been commercially thinned or partially regenerated in the past 30 years; which created and maintained suitable habitat conditions for the flammulated owl.

In reversing the general trend toward understory congestion and increased fire risk in dry-site stands, these alternatives would enhance suitable flammulated owl habitat in the long term. In the short term, there would be no decrease in suitable habitat acres as a result of these alternatives. Treatment would allow flammulated owls to maintain their same general distribution, thus maintaining species viability. Therefore, Alternative 2, 3, or 4 will create and sustain suitable habitat for flammulated owls based on expected long-term (in this case, approximately ten years or more) changes to available habitat for this species. However, while there would be no planned loss of currently suitable flammulated owl nesting habitat due to the action alternatives, the temporary disturbance or potential diminution of forage (lower densities of noctuid moths due to reduction of shrub canopy) from project-related activities may cause short-term negative impacts to this species in the immediate vicinity of harvest units. Effects of actions would not indicate a local or regional change in habitat quality or population status, allowing

flammulated owls to maintain their current distribution. Samson (2005) concluded that short-term viability of the flammulated owl in the Northern Region and on the IPNF is not an issue because:

- No scientific evidence exists that the flammulated owl is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Well-distributed and abundant flammulated owl habitat exists on today's landscape.
- Level of timber harvest in the Northern Region is insignificant.

As a result, the proposed action may impact flammulated owls or their habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction 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 1987 p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

c. Northern Goshawk

Methodology

Goshawk habitat was evaluated using a habitat suitability model derived from data in the Forest timber stand database (TSMRS). Since slope data in the TSMRS database is an average of plots across the stand, using this data to determine suitability can cause the model to exclude stands that have relatively flat microsites, or include portions of stands that are too steep for goshawks to select as nest sites. To rectify this, the model was used only to identify vegetative factors that are predictors of goshawk nest sites, while topographic limitations were determined from digital elevation model (DEM) data. As a result, modeled goshawk habitat "stands" did not necessarily conform to recognized stand boundaries, but are delineated by combining the stand layer with two meter resolution DEM data.

While suitable northern goshawk nesting habitat was initially determined using the Forest-wide HSI model (ref: "Interpretation of IPNF Wildlife Queries" – project file), habitat suitability was validated through site visits, comparing stands modeled as "suitable" to maps of allocated confirmed old growth (see "Mission Brush Old Growth Review"), or by comparing data with ancillary data such as aerial photographs and forester's reconnaissance notes. For habitat analysis purposes, moist-site stands which are allocated old growth and have been confirmed as such on review are assumed to provide suitable nesting habitat. Published studies generally indicate that goshawks prefer to nest in stands which contain relatively high densities of large diameter trees, open understories with sparse ground cover, abundant snags and down woody debris, and high canopy closure punctuated by occasional small openings. These conditions are characteristic of moist-site (cedar/hemlock forest type) old growth on the district.

Although the model may be an adequate broad predictor of habitat suitability, field verification of a limited number of stands modeled as "suitable" within the project area has shown portions of these stands contain too dense an understory to provide preferred nesting habitat. In other words, not every acre of modeled "suitable" stands is necessarily suitable nesting habitat. As a result, the model somewhat overestimates the amount of currently suitable habitat, and also may overestimate the number of suitable acres affected by activities.

Between 2001 and 2006, personnel conducted site visits of 155 discrete stands totaling approximately 5,334 acres of capable goshawk habitat for model validation. Additionally, 30 stands totaling approximately 829 acres of capable goshawk habitat were confirmed as moist-site old growth in the project area. Finally, a combination of forester's reconnaissance notes and recent (2002) aerial photographs was used to determine habitat suitability for another 38 stands (approximately 1,213 acres). Aerial photograph interpretation was generally used to confirm areas that were obviously unsuitable due to recent timber harvest or stands with open-canopied structure, but in a few instances was utilized to compare unverified stands with adjacent stands of similar appearance that had been field validated.

Habitat analysis summarized in the Mission Brush EIS identified 15 suitable goshawk nesting stands of 30 acres or larger within the Mission Brush project area. Six of these stands are subsets of larger patches of confirmed old growth, with areas of steeper slopes removed. Two suitable nest stands contain active or historic goshawk nests, and were extensively reviewed and surveyed during presale activities. Two others were verified and surveyed during field reviews in 2003. One stand was not surveyed due to its close proximity to realigned Highway 95. Several stands were reviewed while validating lynx habitat

components, but never surveyed since they were not proposed for treatment.

One putative nest stand was neither reviewed nor surveyed by the wildlife biologist. However, notes from the project leader indicated this portion of Unit 19 contained large diameter ponderosa pine, larch and Douglas-fir and had a canopy cover of about 75%, but about half of the cover was provided by the dense secondary canopy layer of approximately 9" lodgepole pine. The majority of the lodgepole was predicted to be dead within 10 years due to insect infestation. As a result, the stand was confirmed as suitable nesting habitat with a relatively short expected life span in this condition. Since crews spent 4-5 days conducting preliminary layout and cruise surveys during a portion of the nesting period (early – mid June), it was assumed that any nests or territorial adults within unit boundaries would likely be discovered at this time. Historically, marking and layout crews on the District have had a much higher probability of finding previously undocumented territories than active surveys, since a higher proportion of potential nesting stands are traversed.

In the DEIS, the action alternatives proposed treatment in the stand containing an abandoned Northern goshawk nest (Unit #20). This treatment would have been a shelterwood harvest in Alternatives 2 and 3, and a commercial thin in Alternative 4. One of the comments received pointed out that Reynolds et al. (1992) recommend that all historical nest areas should be maintained. Occupation of the nest in question was last documented in 1992, despite subsequent monitoring in 1993, 1994, 1997, 1998, 2002, and 2003. ("Nest" in this case was a misnomer – while the nest tree still stands, virtually nothing has remained of the nest itself for several years). However, further inspection of the nest stand in late 2003 revealed a previously undiscovered nest suspected to belong to a different goshawk pair than those occupying the Hall Mountain nest. (These nesting birds, if indeed a goshawk pair, eluded detection during surveys of the stand in the 2002 and 2003 nesting periods. Additionally, the territory has apparently not been reoccupied as of April 2004.) As a result, Unit #20 was modified to include a 30-acre exclusionary zone that encompasses both the newly discovered nest site as well as the '92 nest tree and environs.

The northern (remaining) portion of Unit #20 will remain as a proposed shelterwood harvest in Alternatives 2 and 3 (commercial thin in Alternative 4). A field examination of this part of the unit revealed a dense understory of cedar and grand fir up to about 5 m high, and an overstory becoming more crowded with immature Douglas-fir and cedar. This portion of the unit is currently not suitable goshawk nesting habitat, and is becoming even more congested with time.

The potential effects on the northern goshawk and its habitat were determined by predicting the change in habitat suitability that would result from each alternative.

<u>Alternative 1</u>

A number of capable stands are unsuitable because they are in an immature size class, but many have a mature overstory component and have grown out of suitability because the understory is congested by a high density of smaller stems. As time passes, more of these stands will move away from suitability due to increasing understory congestion. Deteriorating stand health will result in large, uniformly-spaced stems being replaced by more numerous, densely-packed smaller stems. The high amount of ladder fuels in stands will prevent natural fire from clearing out this understory. Large snags would eventually disappear, trending these stands even further away from suitable goshawk nesting and foraging habitat. A large stand-replacing fire would remove the dense forests this species prefers, but small fire-produced openings may be beneficial for foraging. Regardless of whether these stands suffer from stand-replacing fire or not, suitable goshawk nesting habitat will be lost over time.

<u>Effects Common to Alternatives 2, 3 and 4</u>

Brush Lake Recreation Proposal

Improvements to recreational facilities in the Brush Lake area may negatively impact goshawks, as they are sensitive to human disturbance. However, there are only a few small (<20 acres) stands that potentially may provide suitable nesting habitat adjacent to the proposed enhancements. While these upgrades would likely increase the number of visitors this area receives, the footprint of the recreation area near the lake would not be significantly larger. It is unlikely that wildlife acclimated to the present amount of disturbance at developed facilities along the lake would be displaced by increased use. While development of a system of motorized trails north and west of Brush Lake represents, on paper, an increase in motorized use; in reality, the old roads that would be converted to ATV trails are presently being used for this purpose.

Future Habitat Enhancement Opportunity

The excluded portion of Unit #20, while not as densely vegetated as the northern portion, still faces the problem of increasing understory congestion from grand fir and Douglas-fir saplings. Following management recommendations outlined by

Reynolds et al. (1992, p. 24), we propose non-commercial thinning of understory vegetation (<6" dbh) throughout the 30-acre exclusion during the non-nesting period (September 30 – March 1), to provide long-term suitable nesting habitat in this stand. This action would remove understory congestion that may be discouraging current use of the nesting stand, and would retain suitable nesting conditions further into the future than the lack of treatment would. There would be no immediate changes to habitat suitability as a result of this proposal.

Vegetation Structural Stages

Existing condition and projected changes of Vegetation Structural Stages (VSS) within capable goshawk habitat in the project area gives the results displayed in the following tables. *Percentages reflect post-treatment conditions for each alternative.

Table 4-16. VSS percentages* within Mission-Brush Project Area

VSS	Size Class	Existing %	Alt 2 %	Alt 3 %	Alt 4 %
1	Open	0.56	8.36	6.76	4.35
2	Seed/Sapling	21.04	21.04	21.04	21.04
3	Immature/Pole	11.52	11.09	11.24	11.19
4	Immature/Medium	28.48	25.44	26.04	26.40
5	Mature/Large	29.20	24.87	25.73	27.83
6	Old Growth	9.20	9.20	9.20	9.20

These results show that VSSs are fairly well distributed across goshawk habitat in the project area, but skewed toward VSS 4 and VSS 5. The proposed timber harvest helps to even out these percentages by removing acres from these VSSs. However, in doing so, this activity could potentially retard the progress of stands toward VSS 6 (Alternatives 2 and 3 more so than Alternative 4). This analysis assumes that any unit with proposed regeneration harvest reverts to VSS 1.

Goshawk habitat within the project area totals roughly 11,000 acres. Dividing the project area at Highway 95 gives two smaller areas that approximate the size of goshawk home ranges in the previously mentioned studies. The area north of the highway (Hall/Mission) contains about 5,597 acres, while the area south of the highway (Brush Lake) is approximately 5,686 acres. Existing VSS distribution and projected post-harvest distribution are shown below:

Table 4-17. VSS percentages* within Hall/Mission portion of Project Area

VSS	Size Class	Existing %	Alt 2 %	Alt 3 %	Alt 4 %
1	Open	0.46	9.53	9.53	2.56
2	Seed/Sapling	32.98	32.98	32.98	32.98
3	Immature/Pole	2.07	1.88	1.88	2.07
4	Immature/Medium	11.64	9.17	9.17	10.38
5	Mature/Large	39.09	32.68	32.68	38.26
6	Old Growth	13.76	13.76	13.76	13.76

Table 4-18. VSS Percentages* Within Brush Lake portion of Mission Brush Project Area

VSS	Size Class	Existing %	Alt 2 %	Alt 3 %	Alt 4 %
1	Open	0.64	7.58	4.41	7.58
2	Seed/Sapling	9.38	9.38	9.38	9.38
3	Imm/Pole	20.83	20.17	20.46	20.17
4	Imm/Medium	44.83	40.85	42.01	40.85
5	Mat/Large	19.57	17.27	18.98	17.27
6	Old Growth	4.75	4.75	4.75	4.75

Within these smaller areas, VSSs are less uniformly distributed than in the project area as a whole. These differences are not surprising given the history of disturbance in these areas. The Hall/Mission area has not sustained any large fires in recent history, but portions were heavily logged in the late 1970s. As a result, large percentages of this area are in VSS 5 & 6, and also in VSS 2. By contrast, much of the Brush Lake area experienced stand-replacing fires in the 1940s – which is evidenced by the relative lack of stands in VSS 6 but high percentages in VSS 4.

In the Hall/Mission area, nearly 900 acres (approximately 16% of this area) in VSS 2 will move into VSS 3 within the next ten years, as these stands originated prior to 1985. In combination with the proposed activity, this natural trend should result in a more equitable VSS distribution, although harvest may impede some stands from reaching VSS 6. Within this area, Alternative 4 provides for a better VSS distribution than Alternatives 2 and 3.

In the Brush Lake area, regeneration harvest reduces VSS 4 and adds to VSS 1 – improving VSS distribution. The action alternatives also reduce the percentage of VSS 5 and may slow the trend toward increased percentages of VSS 6. Most of the regeneration harvest in VSS 4 is of offsite ponderosa pine, so the reduced longevity of this strain makes it unlikely that these stands will survive to reach VSS 5 or 6 (DEIS p.3-18).

Reynolds et al.(1992) advise maintaining VSS proportions within goshawk home ranges of 10% each in VSS 1 & 2, and 20% each in VSS 3-6. Suggestions for VSS distribution are conservative in nature, and are only recommendations rather than requirements. Other resource concerns and/or past disturbances may make it impossible to reach recommended VSS distribution in a given area.

Post-fledging Family Area (PFA)

An analysis of forest structure classes was conducted for hypothetical Post-fledging Family Areas (PFAs) around the two known goshawk nest areas. Reynolds et al. (1992) recommend approximately 10% in grass/shrub, 10% in seedling/sapling, 20% in pole sized or young forest, and 60% in mid-aged to old forest across a roughly 420 acre PFA. Nest areas and natural openings are excluded from PFA analysis, although the area was not mapped at a fine enough scale to detect openings less than five acres in size. Existing condition of PFAs around the two nest areas are summarized below. As with the VSS discussion, this analysis assumes that regeneration harvest reverts stands to the grass/shrub stage, while selective harvest does not change the predominant size class of the stand. Analysis shows that the Hall Mountain territory contains a PFA with well in excess of

60% mid-aged to old forest in all alternatives (there is no proposed regeneration harvest within the PFA). The PFA for the Mission Creek territory contains a higher percentage of immature forest stands than the Hall Mtn. PFA. Although this PFA will also retain at least 60% in mid-aged to old forest, regeneration harvest on 26 acres would elevate the sum of the grass/shrub and seedling/sapling classes above the recommended 20% in Alternatives 2 and 3. However, all 83 acres of seedling/sapling stands were created by timber harvest in 1988, and will likely move into the pole size class within the next five years if they have not already.

Table 4-19. Existing Condition and Projected Effect of Alternatives on Goshawk PFA for known nests in the Mission Brush Project Area

Veg structure	Existing		Alt. 2		Alt. 3		Alt. 4	
Grass/shrub	0	0	0	0	0	0	0	0
Seed/sapling	59	14	59	14	59	14	59	14
Imm/pole	0	0	0	0	0	0	0	0
Mid-old	364	86	364	86	364	86	364	86
Grass/shrub	0	0	26	6	26	6	0	0
Seed/sapling	83	18	83	18	83	18	83	18
Imm/pole	86	19	71	16	71	16	86	19
Mid-old	285	63	274	60	274	60	285	63

Alternative 2

Direct and Indirect Effects

Alternative 2 would treat approximately 2,503 acres of capable habitat, 561 acres of which are modeled as currently suitable. More than one-half (1,372 acres) of the capable habitat within proposed units will be treated by selective harvest. Selective cutting would sustain forest structure that is compatible with suitable goshawk nesting habitat, or in some cases would create suitable nesting structure by removing understory congestion.

Approximately 1,012 acres of capable habitat will be treated by regeneration harvest, including 255 acres of modeled suitable habitat. In general, regeneration harvest will move stands out of suitable nesting condition, but may still provide, or even enhance, foraging conditions on the periphery of these units.

Both of the nest stands identified from previous surveys are in the vicinity of treatment areas: the 30-acre exclusion containing the abandoned nest is next to proposed shelterwood harvest Unit #20, while the more recent nest is adjacent to a proposed commercial thinning (#48). In the first case, it is likely that the pair abandoned this stand when the increasing stem density moved it away from suitable condition. While the included portion of Unit #20 will remain unsuitable habitat in this alternative, treatment should enhance conditions in Unit #48 and provide suitable habitat for a longer time period than no action would.

Most of the 1,372 capable acres treated by selective harvest in this alternative should move into suitable habitat condition over time. At the same time, as many as 255 acres of currently suitable habitat will be converted to unsuitable condition by regeneration harvest. While regeneration treatments in this alternative may delay 757 acres of capable habitat from reaching suitability, there is no guarantee that all of these acres will achieve suitable condition through no action. Finally, proposed treatments would reduce the number of 30 acre contiguous nesting stands to 12 in this alternative.

Alternative 3

Direct and Indirect Effects

Alternative 3 proposes treating 1,947 acres of capable goshawk habitat, of which 451 acres are currently suitable. Approximately 1,120 acres would be treated by selective harvest, while 827 acres would be regenerated. This alternative proposes regeneration of only 183 acres of habitat modeled as currently suitable, since Units #19 and #140 would be dropped.

Alternative 3 would trend 1,496 acres toward suitability. An additional 644 acres would be set back by regeneration harvest, and 183 acres would no longer be suitable. Once again, these 644 acres may not reach suitable conditions without management intervention or a stand-replacing event. This alternative would result in 12 contiguous nesting stands of 30 acres or larger.

Alternative 4

Direct and Indirect Effects

Alternative 4 would treat approximately 2,039 acres of capable goshawk habitat, 436 acres of which are currently suitable. Only 507 acres would be treated by regeneration harvest, including 113 acres of suitable habitat. Effects of treatments within individual units would be the same as those described for Alternatives 2 and 3. This alternative differs mainly because units in the Mission Creek drainage would be dropped (except Unit 48), and the remainder of Unit 20 would become a selective harvest. Restrictions around active nests would be the same as explained above.

This alternative would move 1,209 acres toward suitable habitat condition more rapidly than no action would. Regeneration will eliminate 113 acres from suitability, and 394 additional acres of unsuitable habitat will be set back (but would reach suitable condition faster than if no action were taken). This alternative would preserve 12 contiguous nesting stands of >30 acres. Alternative 4 would provide fewer acres of suitable habitat than Alternatives 2 and 3 in the long term, but have smaller impact on suitable goshawk habitat in the short term.

Cumulative Effects Common to Alternatives 2, 3, and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for northern goshawk:

Past Activities and Events – In combination with past natural and human-caused events, the total effect of action alternatives would help restore natural processes by favoring tree species composition and structures that are consistent with historic vegetative patterns of dry site ecosystems. While some stands have lost or are losing sufficient forest structure to achieve habitat suitability, proposed actions would lead to long-term stability of habitat for northern goshawks by promoting and maintaining a more open forest structure. Most of the stands around Brush Lake were heavily impacted by stand-replacing fire in the 1940s, and subsequently have not had significant logging. Most of these stands have not reached sufficient size and structure to provide Northern goshawk habitat. In the Mission Creek area, historic logging has both enhanced and deteriorated goshawk nesting habitat. Sales that utilized regeneration harvest, such as West Mission Gillon, 96 Tiers, Mission 30, and older unnamed sales from the 70s created large openings that are probably only used by goshawks at the periphery. More recent sales (portions of 96 Tiers, Along Hall) utilized selective harvest techniques that were less likely to deteriorate, and in some cases actually improved, goshawk habitat. In general, sales that involved regeneration logging or overstory removal damaged goshawk habitat, while sales that involved salvage or thinning from below preserved or improved habitat. None of these activities would have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Firewood cutting is anticipated to continue along seasonally and yearlong open roads. This activity may be disruptive to Northern goshawks that may be nesting in the area, as they are particularly sensitive to disturbance during the courtship and nesting periods. However, since it would emanate from open roads, this activity would only incrementally elevate disturbance above what motorized traffic would normally provide. It is unlikely that personal use firewood cutting would make habitat modifications that would impact goshawks. Continued fire suppression also has mixed impacts on Northern goshawks. While suppression efforts may protect currently suitable nest stands from stand-replacing fire, this activity has also contributed to the understory congestion of dry-site stands that has reduced suitable goshawk habitat in recent years. Various recreation activities and routine road maintenance are unlikely to impact Northern goshawks, although off-road recreational use during the spring and early summer may disturb nesting goshawks to some degree.

Other Restoration Projects – It is unlikely that noxious weed treatments would have any impacts on Northern goshawks. Thinning young, small diameter trees and future underburning would be designed to increase the overall health and vigor of the stands. Additionally, this thinning would improve species composition, resulting in stands that are more ecologically stable in the face of potential disturbances. Consequently, thinning actions would promote long-term stability of habitat conditions for northern goshawks.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (mainly FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above),

private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Conclusion

In reversing the general trend toward understory congestion and increased fire risk, these alternatives would result in increased suitable habitat over time. Possible short-term (15 years or less) impacts to goshawk habitat will be offset by long-term (>15 years) improvements in habitat for this species. The cumulative effects analysis area would continue to provide at least three suitable 30-acre nest areas per 5,000-6,000 acres in all alternatives. Alternatives 2, 3, or 4 would allow goshawks to maintain their same general distribution, thus maintaining species viability. Samson (2005) concluded that short-term viability of the goshawk in the Northern Region and on the IPNF is not an issue because:

- No scientific evidence exists that the northern goshawk is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Well-distributed and abundant northern goshawk habitat exists on today's landscape.
- Level of timber harvest in the Northern Region is insignificant.
- Suppression of natural ecological processes has increased and continues to increase amounts of northern goshawk habitat.

Therefore, these alternatives may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction 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). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

d. Fisher

Methodology

Fisher habitat was evaluated using a habitat suitability model derived from data in the Forest timber stand database (TSMRS). Modeling rules and assumptions can also be found in the project file. The analysis uses management guidelines from *Fisher Biology and Management in the Western United States* (Heinemeyer and Jones, 1994) and *DRAFT, Forest Carnivores in Idaho*, (IDF&G, 1995). The percent of the area in mature/old forest structure (i.e. suitable habitat) will be displayed and compared to the guidelines. Changes from the existing condition relative to guidelines for forest structure will be discussed. Fisher and marten habitat is difficult to model because habitat requirements are not well understood and the timber stand database does not consistently characterize the amount of large woody debris these species require for denning and cover. It is possible that the model overestimates fisher habitat because there is incomplete data on snags or down logs. However, the model generally eliminates previously logged stands from suitable habitat, and mature, unlogged stands are probably providing necessary dead and down material. In addition, a fisher's generalist diet implies that they will forage in nearly any type of forested habitat provided there is sufficient ground cover to attract prey.

Fisher habitat was verified incidentally during lynx habitat field validation. Any stands that were affirmed as prospective lynx denning through field reviews can also be assumed to provide suitable fisher/marten denning and foraging habitat, as the requirements are very similar. Additionally, any confirmed old growth within capable fisher/marten habitat can be considered currently suitable, as these mature stands provide large amounts of standing and down material that these species prefer. Approximately 979 acres of suitable fisher/marten habitat were confirmed as lynx denning habitat, and an additional 547 acres of fisher/marten habitat are confirmed old growth. This sample confirmed approximately 1,526 (66%) of the 2,296 acres identified by the model as suitable fisher/marten habitat. Given the prevalence of mature forest in the project area, it is reasonable to assume that most of the remaining unverified 770 acres of suitable habitat are, in fact, currently suitable.

Because of their preference for older stands with dense canopy cover and large snags (used for maternal dens), suitable fisher habitat closely mimics that required for other old-growth indicator species such as goshawk and pileated woodpecker. However, unlike goshawks, fishers prefer stands with congested understories for the cover these stands offer for hunting and avoiding predators. The potential effects on the fisher and its habitat were determined by predicting the change in habitat

suitability that would result from each alternative.

Alternative 1

The no action alternative would preserve potential foraging habitat for fisher, and would bring some stands into suitable denning condition more rapidly than treatment would. However, with this comes the increased risk of stand-replacing wildfire, which would effectively remove most burned-over areas from suitable fisher habitat for many years. Because the canopy cover of the drier types is higher than it would be under a natural fire regime, fisher may tend to use these dry stands more now than they would have historically. Not coincidentally, these stands are at higher risk of stand-replacing wildfire than historic, open grown dry-site stands would have been. In summary, while the no action alternative would provide better fisher habitat than the action alternatives in the near future, some of these acres may subsequently be converted to unsuitable condition through fire.

Effects Common to Alternatives 2, 3 and 4

Vegetation/Habitat

The existing condition of forested habitat on NFS lands in the Mission Brush wildlife analysis area and the guidelines for forest structure by subdrainage are displayed in the following table.

Table 4-20. Existing Condition of Forested Habitat on NFS Lands in Mission Brush Wildlife Analysis Area and Subdrainage Guidelines

Forest Structure	Existing Condition*		High Quality	Moderate Quality	Low Quality
Mature/sawtimber	4,532a	49%	65-75%	≥40%	30-40%
Immature sawtimber **	2,020a	22%	10-25%	na***	na
Pole/sapling	1,581a	17%	10-25%	na	na
Open/seed	1,130a	12%	na	na	na

** % of NFS capable habitat in the wildlife analysis area*
*** includes multi-story stands*
**** not applicable – no guidelines identified*

Based on the amount of mature/sawtimber forest structure and old growth, the existing condition of the Mission Brush wildlife analysis area meets the criteria needed for a moderate quality subdrainage. The project area could reasonably be split at Highway 95 for habitat analysis purposes, but the portion south of the highway ("Brush Lake") does not contain the minimum amount of capable habitat acres recommended by Heinemeyer and Jones (1994) for "subdrainage" analysis. Even the combined capable acres on both sides of the highway (9,263 acres) are near the low end of the recommended size range (6,178-61,780 acres). However, a cursory analysis shows the area north of the highway, containing nearly 80% of the capable fisher habitat in the project area, has a much higher proportion of mature forest (>55%) than the portion south of the highway (<25%). This difference is largely accounted for by the dissimilar disturbance histories of the two areas: the 1940's fire resulted in most of the Brush Lake stands being classified as immature sawtimber, while most recent disturbance in the Hall-Mission area is a result of timber harvest.

Table 4-21. Existing condition and projected effects of alternatives on forest structure of fisher/marten habitat in the Mission Brush Project Area.

Forest Structure	Existing Condition* (Alternative 1)		Alternative 2		Alternative 3		Alternative 4	
	acres	%	acres	%	acres	%	acres	%
Mature/sawtimber	4,532	48.9	3,912	42.2	3,931	42.4	4,445	48.0
Immature sawtimber	2,020	21.8	1,676	18.1	1,725	18.6	1,900	20.5
Pole/sapling	1,581	17.1	1,530	16.5	1,543	16.7	1,562	16.9
Open/seedling	1,130	12.2	2,138	23.1	2,057	22.2	1,356	14.6

** % of NFS capable habitat in the wildlife analysis area*

Existing forest structure distribution and projected distribution under each alternative is shown in Table 14. Although suitable habitat would be reduced under all action alternatives, each would maintain >40% of the capable habitat in the analysis area as mature/old forest structure, and about 20% as young forest that would succeed to older forests. The project area would continue to meet minimum forest structure recommendations for a "moderate quality subdrainage" under each alternative.

Brush Lake Recreation Proposal

The proposed recreational developments in the Brush Lake area would have very minor effects on fisher, as no suitable habitat currently exists in the vicinity of planned improvements. Since fishers generally prefer relatively remote areas of mature forest for denning and foraging, it is unlikely that the area to be developed receives more than sporadic incidental use by fishers, assuming they are present in this portion of the District. In general, the road beds that would be converted to ATV trails are already being utilized as such. The proposed trail system would traverse only one currently suitable denning stand that is between (within ¼ mile of) Highway 95 and a Forest Road drivable by passenger vehicles. The overall effect of the action alternatives would be to reduce the drivable road density throughout the project area.

Alternative 2

Direct and Indirect Effects

Alternative 2 would treat approximately 1,839 acres of capable habitat, 449 acres of which are currently suitable. Most treated acres are in upland areas on relatively steep slopes well away from riparian areas, and probably only signify transitional range for fisher.

Suitable fisher habitat can be preserved through selective harvesting: these prescriptions would maintain at least 50% overstory canopy cover, Regional snag protocols would guarantee adequate snag and snag recruitment density, and thinned units would be grapple piled rather than underburned so some coarse woody debris remains on site. Alternative 2 also proposes regeneration harvest of 225 acres of currently suitable fisher habitat. Regeneration harvest generally eliminates stands from suitable denning condition, although foraging opportunities would remain to some extent.

Within the Brush Lake area, all "suitable" acres proposed for treatment are dominated by larch, Douglas-fir or lodgepole pine and have high levels of root-rot infestation. While they may provide a temporary flush of fisher denning opportunities, this flush is likely to be short-lived since these stands will lay a better groundwork for catastrophic wildfire, and overstory canopy cover would be steadily reduced as tree mortality increases. In addition, suitable stands in this area are generally small and widely scattered, and lack connectivity corridors linking them to other suitable habitat.

In the Mission Creek area, 185 acres of currently suitable fisher habitat are proposed for regeneration harvest. This consists of cedar/hemlock or subalpine fir-dominated stands, and to a lesser extent, stands dominated by Douglas-fir. Suitable habitat in Units 58, 60 and 125 (~30 acres each) are somewhat isolated, and lack connectivity to other suitable stands. Other suitable habitat within proposed treatment units are on the periphery of capable habitat, and thus would not cause breaks in connectivity corridors if harvested.

Alternative 3

Direct and Indirect Effects

Alternative 3 represents an intermediate between Alternatives 2 and 4 concerning fisher habitat. This alternative would treat approximately 1,442 acres of fisher habitat, 393 of which are currently suitable. Regeneration prescriptions would affect 182

acres of currently suitable habitat.

In the Mission Creek area, this alternative is very similar to Alternative 2. The only substantial difference is that Unit 41, which contains approximately 14 acres of suitable habitat, is absent from this alternative.

In the Brush Lake area, this alternative would treat 36 fewer suitable acres than Alternative 2 through the removal of Units 19 and 129. Exclusion of Unit 19 in Alt 3 would retain 29 acres of suitable fisher denning habitat that would be treated in Alt 2. However, Alt 3 would do less to reduce wildfire risk , and potential elimination of suitable habitat, in this area.

Alternative 4

Direct and Indirect Effects

Because this alternative drops most of the units in the Mission Creek drainage, only 1,025 capable acres would be treated. Three hundred thirty-one of these acres are in suitable habitat. Acres of capable habitat treated by selective harvest would be virtually the same in this alternative as in Alternative 2 – the only difference is 51 acres of selective harvest in Alternative 4 that would be regenerated in Alternative 2. The feature that makes this alternative discrete from Alternative 2 with regard to fisher habitat is the amount of habitat in a regeneration prescription. In Alternative 4, only 88 acres of suitable habitat would be regenerated.

While this alternative may reduce denning and foraging opportunities more rapidly than the no action alternative, it would provide more suitable habitat in the short term than Alternatives 2 or 3. Alternative 4 would reduce wildfire risk in the Brush Lake area where fisher habitat is marginal, and would preserve most currently suitable habitat in the Mission Creek drainage.

Cumulative Effects Common to Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for fisher:

Past Activities and Events – Past logging activities, including salvaging of occasional stems, almost universally deteriorated fisher habitat by removing forest canopy, snags, and current and future dead and down material. While fisher may use previously harvested stands for foraging and occasionally denning, unharvested stands are preferred for the latter. Any of the past USFS timber sales had the potential to cause declines in fisher habitat, but particularly the riparian area logging done in the East Fork of Mission Creek prior to the 1950's. In combination with past natural and human-caused events, the proposed action would reduce the quantity of suitable fisher denning habitat. However, given the low density of fisher populations, it is unlikely that they are limited by denning habitat. Previous activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Firewood cutting is anticipated to continue along seasonally and yearlong open roads. This activity has the potential to reduce snags within 50 meters of open roads. While there may be minor reductions in miles of open roads as a result of the action alternatives, this would not significantly reduce snag vulnerability to firewood gathering. Although it is unlikely to disrupt normal fisher use patters, this activity could result in fisher habitat deterioration adjacent to open roads by removing large snags that represent future dead and down wood denning opportunities. Fire suppression activities are generally good for fisher habitat, as they protect denning habitat from stand-replacing fire and contribute to understory congestion in dry-site stands that provide cover for small mammals that fishers prey upon. Various recreation activities and routine road maintenance are unlikely to impact fishers, although motorized oversnow use can provide access for trappers who may inadvertently catch fishers.

Other Restoration Projects – It is unlikely that noxious weed treatments would have any impacts on fisher. Thinning young, small diameter trees and future underburning would be designed to increase the overall health and vigor of the stands. This is expected to produce lower densities of large diameter trees, potentially creating fisher denning habitat. However, this activity would usually be confined to drier forest types that fisher are less likely to utilize.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (mainly FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Conclusion

On the Bonners Ferry Ranger District, the amount of fisher denning habitat is comparable to the quantity available historically, as evidenced by comparison of the sum of mature/large and old growth forest size classes now versus historically. Despite a general direction on the IPNF to trend stands toward a more seral state, there has also been an effort to preserve mature and old-growth stands, allow natural succession in riparian areas, and preserve and recruit large woody debris forest wide. While this management strategy may temporarily reduce fisher habitat at the local scale, habitat should improve for this species with time and should be maintained on a landscape scale. There will be no increases in access with any of the alternatives, so there will be no decrease in security for fisher.

In addition, standards outlined in the LCAS will benefit fisher as well as lynx. These standards assure that high quality denning habitat will be protected, that there will be limits to the reduction of forest cover over a given decade, and that snowshoe hare habitat will be protected to supply high densities of this important prey species. INFISH guidelines and BMPs will assure that riparian habitats important to fishers will be undisturbed. Consequently, Alternatives 2, 3 and 4 may impact fishers or their habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction 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 1987 p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

e. Western 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.

Alternative 1

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

Effects Common to Alternatives 2, 3 and 4

Recreational improvements near Brush Lake also have potential to disrupt toad breeding or cause direct mortality. However, this area is currently heavily used by recreationists, and improvements around the lake would not significantly expand the footprint of concentrated human use. This project would create a system of ORV trails north and west of the lake that could also result in toad mortality. However, most of the proposed trails are existing road systems that are already being used for this purpose. This project would place motorized restrictions on areas adjacent to, as well as the wetlands north of, Brush Lake. This designation should reduce potential disturbance to breeding habitat and mortality of western toads in this part of the project area.

Alternative 2

Direct and Indirect Effects

Implementation of Alternative 2 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, impacts to boreal toads should be minimal.

There are several proposed treatment areas adjacent to Brush Lake and nearby wetlands (units #140, 7, 9, 10, 11 and 13). Of these, units #7, 9, 10 and a portion of 13 would be winter logged, and consequently would not impact Western toads during timber harvest. Although in close proximity to the lake, unit #140 is steep, dry and rocky; so use of this area by adult toads would be infrequent. As a result, only unit #11 and the remainder of unit #13 are expected to present a risk of mortality to dispersing toads during the logging phase, although fuels treatments in any of the units in the Brush Lake present a risk of toad mortality.

Elsewhere in the project area, impacts to boreal toads are possible but unlikely. Most of the drainages north of Highway 95 contain small, high gradient, fast moving streams that likely provide little breeding habitat. The lack of breeding pools, in combination with activity buffers around water bodies, reduces the possibility of impacts to toads to a nearly insignificant level in the Hall/Mission area.

Although implementation of Alternative 2 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.

Alternative 3

Direct and Indirect Effects

Of the action alternatives, Alternative 3 is likely to be the least impactive on Western toads. There would be no road construction, and the number of acres treated in the Brush Lake area would be considerably reduced. All units adjacent to Brush Lake or associated wetlands would be winter logged. As discussed above, impacts to toads north of Highway 95 would be minor or nonexistent due to the lack of breeding habitat and activity buffers around water bodies.

Alternative 4

Direct and Indirect Effects

The effects of Alternative 4 are expected to be very similar to those of Alternative 2, since both alternatives propose the same treatment and road construction in the Brush Lake area. This alternative would treat fewer acres north of Highway 95 than Alternative 2, although the difference in effects to Western toads would be inconsequential, for reasons explained in the Alternative 2 discussion.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for Western toads:

Past Activities and Events – Since toads utilize a variety of forested habitats, historical timber harvest had the potential to have impacts on toads in the form of occasional direct mortality from vehicles. Similar to this project, the effects of many of these events were likely short-term (during the logging and fuels treatment phases), and toads would have resumed normal activities afterward. Logging activity that resulted in large openings may have reduced the habitat toads would utilize, since they have an affinity for forested cover in upland areas. However, the major historic disturbance in the Brush Lake area was the 1940s fire, which would have reduced cover adjacent to the lake and wetlands. While there was some salvage harvest following this fire, irreversible habitat alterations had already taken place. A lasting legacy of this salvage is the expansion of the road system in

this area, which offers a continuing source of potential mortality – including those "non-drivable" road segments that have been utilized as ORV trails. However, instances of mortality would have been infrequent and isolated. Of greater concern is the access to the wetland areas above Brush Lake that this road system provides ORV users.

Current Management Activities – Personal use firewood gathering, various recreation activities (excluding off-road motorized use, addressed in alternative discussions), standard road maintenance, and continued fire suppression would not significantly impact Western toad populations. There is a risk of direct mortality associated with these activities as a result of increased vehicular use of roads, but these instances would also be infrequent and isolated.

Other Restoration Projects – TSI activities, including thinning young, small diameter trees, is unlikely to have impacts on Western toads. No breeding habitat would be altered or breeding disrupted, and there would be no off-road vehicular use associated with this activity. There is the possibility of an occasional adult mortality due to increased vehicular use on roads to access thinning areas, but this use would be of short duration in a given area, and direct mortality rare and inconsequential. Similarly, effects of noxious weed treatments would likely be limited to possible mortality caused by vehicles used for spraying, since areas of surface water are buffered from chemical application (USDA 1995). Future underburning may also cause occasional mortality, but would generally be limited to steep, dry areas infrequently used by adult toads.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (mainly FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Conclusion

The proposed project recreation improvements may result in occasional direct mortality to dispersing Western toads, although a some mortality from current use is probably occurring already. These improvements should also reduce disturbance to breeding habitat by directing ORV use away from sensitive areas where use is currently unrestricted. All three action alternatives may cause adverse impacts to toads during project implementation. However, this risk is considerably reduced by project design features including timing restrictions, INFS buffers and BMPs. In addition, Alternative 3 further reduces this risk by eliminating road construction and limiting timber harvest to the non-active period in the most sensitive habitat area (Brush Lake and associated wetlands). Although the action alternatives may slightly elevate the risk of direct toad mortality, no breeding habitat will be affected by this proposal. Consequently, Alternatives 2, 3 and 4 may impact Western toads or their habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction 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 1987 p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

4.6-D. Management Indicator and Other Species

a. Pileated Woodpecker

Methodology

Habitat management for pileated woodpeckers is based on direction in *Old-Growth Habitat and Associated Wildlife Species in the Northern Rocky Mountains* (USDA 1990) and is based on an analysis done for size class and old growth. The analysis methodology for determining potential effects on pileated woodpeckers involved mapping old growth and mature forest stands (i.e. suitable nesting habitat) in the wildlife analysis area and delineating hypothetical 1,000-acre home ranges around suitable nesting stands/groups of stands.

Based on relative habitat values and the acres of suitable nesting habitat a home range should have (USDA 1990), areas with at least 100 acres of contiguous mature/old forest habitat and an additional contiguous 100 acres of immature/sawtimber size tree

habitat were identified as having sufficient suitable nesting habitat. Once home ranges with suitable nest stands were identified, the suitability of surrounding stands in the home range to provide adequate feeding habitat was evaluated. Within each home range at least 500 acres of sawtimber/mature sawtimber forest and/or immature sawtimber habitat is needed to provide adequate feeding habitat. Project impacts on suitable habitat were then determined for each home range.

This analysis focuses on potential reduction of large snags, and on trends toward mature forest structure. Direct and indirect effects reflect changes in habitat conditions that would result from implementation of the alternatives. As discussed in the Affected Environment section, snag habitat for nesting is considered more limiting than foraging habitat. Nesting habitat is dependent on the age and size of trees, which makes pileated woodpeckers a good indicator species for older, larger-diameter trees and late-successional forests. Specific parameters analyzed for this assessment include the changes in distribution and quantity/quality of large snag habitat.

Alternative 1

There would be a continued shift in species composition toward more shade tolerant species in the majority of the stands. This change would trend stands toward a smaller size class and younger age class of trees. Consequently, snag production would shift away from the larger, longer-lived species, affecting the long-term stability and persistence of large snag habitat in the Mission Brush area. Habitat for species associated with large snags, such as the pileated woodpecker, would continue to decline. Although timber harvests over the last 20 years have begun to change the species composition toward long-lived seral tree species, the presence of large snags would continue to be relatively uncommon due to the overabundance of Douglas-fir and grand fir.

High fuel accumulations resulting from dead and dying trees would lead to a higher risk of stand-replacing fires. If a stand-replacing fire were to occur in the Brush Lake area, there would be only minor consequences to pileated habitat because there would be loss of a relatively small amount of mature and old growth habitat components. However, stand-replacing fire in the Hall Mountain/Mission Creek area would have greater impacts on this species, since these areas contain a higher percentage of currently suitable nesting habitat in the project area.

Effects Common to Alternatives 2, 3 and 4

Vegetation/Habitat

Analysis identified a total of 13 hypothetical homeranges that were associated with potential nesting stands of >100 acres. Once home ranges with suitable nest stands were identified, the suitability of surrounding stands in the home range to provide adequate feeding habitat was evaluated. All but one (HR1) home range currently contain at least 500 acres of sawtimber/mature sawtimber forest and/or immature sawtimber habitat to provide adequate feeding habitat. There are no activities proposed in this homerange. Impacts on suitable habitat were then determined for each home range, again assuming that regeneration harvest would convert a stand to the “open/seedling” stage while select harvest would not.

The existing condition of the 13 hypothetical homeranges, along with the projected effects of each action alternative, are shown in Table 15. Under Alternative 4, all of the homerange areas (except HR1) would continue to provide adequate forest structure to support pileated nesting and feeding. In Alternatives 2 & 3, two additional homeranges (HR8 and HR9) would have mature and immature sawtimber content reduced below 500 acres. However, this analysis assumes that there is no habitat overlap between adjacent homeranges, and that woodpeckers would not patially utilize adjacent habitat in Canada or the Gillon Creek watershed. Since both of these homeranges would continue to provide >450 acres of mature and immature sawtimber, resident woodpeckers likely could make up for this deficit by using areas outside their hypothetical “homerange”. Even if these homeranges are no longer considered viable after treatment, Alternatives 2 & 3 would continue to provide a minimum of 10 suitable homeranges within the analysis area.

Brush Lake Recreation Proposal

The proposed recreational developments in the Brush Lake area would have very minor effects on pileated woodpeckers, since little suitable habitat currently exists in the vicinity of planned improvements. This species is not particularly sensitive to human disturbance, and large snag densities would not be substantially reduced by this feature of the proposed action. This area currently does not provide pileated woodpeckers the patches of large diameter trees they require for nesting, and is unlikely to in the future due to the high mortality of off-site ponderosa pine that dominates this area.

Alternative 2

Direct and Indirect Effects

Across the entire cumulative effects analysis area, approximately 1,487 acres of suitable pileated woodpecker habitat would be treated by timber harvest. Many of the acres of currently unsuitable habitat proposed for treatment have considerable mortality. Even if left untreated, it is unlikely that they would reach late successional forest structure because of the predominance of Douglas-fir and the mortality occurring and predicted to occur. Given that these stands are unlikely to provide nesting for pileated woodpeckers, treatment would accelerate the trend of these stands toward suitable habitat.

Due to past disturbances (repeated large scale lethal fires), older, larger-diameter trees and late successional forests are, to some extent, lacking in the Brush Lake area. Relatively little of the habitat in this area presently provides pileated woodpeckers the patches of large diameter trees (mature and old growth structure) they require for nesting.

Consequently, proposed treatments in this area would have a minor immediate effect on pileated woodpecker habitat. There is a limited amount of mature forest that occurs within this portion of the Mission Brush project area that would be affected by cutting prescriptions. With the exception of Units 15, 17 and 19, mature sawtimber would not be regeneration harvested. Instead, harvest would focus on smaller diameter stems of shade tolerant species, while large diameter snags and snag recruitment trees – particularly ponderosa pine and larch – would be protected. Outside of proposed units, tree mortality in lower risk stands would continue to advance, producing higher quantities of smaller snags, but not quality snags required by pileated woodpeckers.

In the Hall Mountain area, harvest activities would take place in inventoried dry-site old growth (Units 22, 26, 28 and 30). These units are also proposed for improvement cuts and large diameter stems would be protected. Because stands on Hall Mountain are generally older than those in the Brush Lake area, suitable pileated woodpecker habitat is much more abundant. As a result, treatment would affect a smaller proportion of potential nesting habitat.

Over the long-term (about 80-100 years), 963 acres of regeneration vegetation treatments would convert tree species composition to longer-lived seral species (e.g. ponderosa pine, western larch, western white pine) and encourage the persistence and sustainability of large snag habitat.

Selective tree cutting is scheduled on 1,997 acres that would favor leaving the desired tree species and trend these stands to an older size class and promote larger size snags. Of these acres, 447 acres are presently characterized as mature stands.

Table 4-22. Existing Condition and Projected Effects of Alternatives on Hypothetical Pileated Woodpecker Home Ranges in the Mission Brush Project Area

Home Range	Alternative	Size Class (Acres)			
		Mature/Sawt.	Imm. Sawt.	Pole/Sapling	Open/Seed.
HR1	Alt. 1	154	288	498	73
	Alt. 2	154	288	498	73
	Alt. 3	154	288	498	73
	Alt. 4	154	288	498	73
HR2	Alt. 1	169	605	207	22
	Alt. 2	150	557	207	89
	Alt. 3	169	605	207	22
	Alt. 4	150	557	207	89
HR3	Alt. 1	273	525	103	94
	Alt. 2	273	324	76	322
	Alt. 3	273	434	80	208
	Alt. 4	273	324	76	322
HR4	Alt. 1	175	655	54	159
	Alt. 2	163	621	54	206
	Alt. 3	175	655	54	159
	Alt. 4	163	621	54	206
HR5	Alt. 1	370	344	36	258
	Alt. 2	360	318	36	294
	Alt. 3	360	318	36	294
	Alt. 4	370	333	36	269
HR6	Alt. 1	747	99	0	162
	Alt. 2	646	99	0	263
	Alt. 3	646	99	0	263
	Alt. 4	747	99	0	162
HR7	Alt. 1	673	35	230	110
	Alt. 2	635	35	230	148
	Alt. 3	635	35	230	148
	Alt. 4	673	35	230	110
HR8	Alt. 1	361	214	285	147
	Alt. 2	268	191	258	290
	Alt. 3	268	191	258	290
	Alt. 4	361	214	285	147
HR9	Alt. 1	486	310	160	41
	Alt. 2	372	107	160	358
	Alt. 3	372	107	160	358
	Alt. 4	477	269	160	91
HR10	Alt. 1	624	42	174	177
	Alt. 2	596	32	174	215
	Alt. 3	596	32	174	215
	Alt. 4	624	42	174	177
HR11	Alt. 1	855	108	0	38
	Alt. 2	810	104	0	86
	Alt. 3	855	108	0	38
	Alt. 4	855	108	0	38
HR12	Alt. 1	397	364	11	247
	Alt. 2	353	364	11	291
	Alt. 3	353	364	11	291
	Alt. 4	397	364	11	247
HR13	Alt. 1	636	326	40	45
	Alt. 2	522	310	40	174
	Alt. 3	522	310	40	174
	Alt. 4	636	326	40	45

Treatment of dry sites to remove competing understory trees so that the stands obtain a more open condition may decrease the value of the stands to pileated woodpeckers. Pileated woodpeckers prefer dense stands with large snags. Currently, this is often the scenario in today's dry sites because the density has resulted from fewer understory burns, and the existing large snags resulted from earlier open stands with less competition. Thus, the existing condition of good habitat in dense dry sites is a temporary situation that would decline through stand-replacing wildfires, or death and fall down of the large snags. Removing competing understory would increase the number of large snags in the long term, but may reduce the density of the stand below that preferred by pileated woodpeckers. This effect should be compensated by the growth of the large amount of stands in the middle-aged size class for the short-term loss possibly experienced by this species.

Alternative 3

Direct and Indirect Effects

Alternative 3 proposes harvest on 1,384 acres of suitable pileated woodpecker habitat. Approximately 924 acres of currently suitable habitat would be treated by selective harvest, while 460 acres would be regenerated. Selective tree cutting would favor leaving the desired tree species and trend these stands to an older size class and promote larger size snags.

Alternative 4

Direct and Indirect Effects

Alternative 4 would harvest about 1,086 acres of suitable pileated woodpecker habitat. Approximately 78 currently suitable acres would be regenerated.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for pileated woodpeckers:

Past Activities and Events – Timber harvest on USFS lands in Mission Creek would have reduced snag densities in logged stands in nearly every instance, particularly prior to adoption of the Forest Plan in 1987 when standards for snag retention were weak or disregarded. The long-term impact of these activities is the reduction of snags of all sizes. In subsequent years, snag retention and snag recruitment (leaving higher densities of green trees for future snags) in harvested areas has improved through implementation of Forest Plan standards and, more recently, adoption of the Northern Region Snag Protocol (USDA 2000). In general, sales that involved regeneration logging or overstory removal damaged pileated woodpecker habitat, while sales that involved salvage or thinning from below preserved or improved habitat. While tree mortality in untreated stands has increased Forest-wide, the majority of affected trees are in smaller size classes. As a result, the ultimate legacy of historic logging in the project area is a decrease in *large*-diameter (>20" dbh) snags. Similarly, the Brush Lake fires of the 1940s has left stands that are generally composed of smaller-diameter trees than this species prefers for nesting. However, these activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline.

Current Management Activities – Firewood cutting is anticipated to continue along seasonal and yearlong open roads. This activity has the potential to reduce snags within 50 meters of open roads. However, most snags available to firewood cutting activities would be in the smaller size class. Therefore, this activity would probably have inconsequential impacts to pileated woodpecker habitat. Various recreation activities and routine road maintenance are unlikely to have any impacts on pileated woodpeckers.

Other Restoration Projects – Thinning young, small diameter trees would be designed to increase the overall health and vigor of the stands. Additionally, thinning and underburning would improve species composition and structure, resulting in stands that are more ecologically stable in the face of potential disturbances. Consequently, thinning and underburning actions would help promote long-term stability of habitat conditions for pileated woodpeckers. It is unlikely that noxious weed treatments would have any impacts on this species.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (mainly FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in

sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Conclusion

The proposed project incorporates design features that maintain minimum numbers of snags within the harvest units. In addition to this, there are numerous snags being created outside of the proposed units that would not be treated. Fuel reduction in the form of removal of some dying trees may be favorable in the long term to this species because of the reduction of fire risk. Although this project and the others proposed for the Idaho Panhandle National Forests would make only a small decrease in fuel loading, it is an incremental effect that cumulatively over time should assist in reducing the risk of stand-replacing fires. For pileated woodpeckers, stand-replacing fires are a negative impact because they reduce the canopy even though they also create large numbers of snags. Treatment would trend stands toward a larger size classes and older age classes of trees. No treatments are proposed that would reduce old growth structure or integrity. Samson (2005) concluded that short-term viability of the pileated woodpecker in the Northern Region and on the IPNF is not an issue because:

- No scientific evidence exists that the pileated woodpecker is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Well-distributed and abundant pileated woodpecker habitat exists on today's landscape.
- Level of timber harvest in the Northern Region is insignificant.

Consequently, Alternatives 2, 3 and 4 may cause temporary reductions in pileated woodpecker nesting habitat at a local level, but would not likely indicate a local or regional change in habitat quality or population status.

Consistency with Forest Plan and Other Regulations

All proposed alternatives would meet and exceed Forest Plan goals and objectives for managing snag habitat (USDA 1987, Appendix X). While some tree cutting would occur within designated old growth in the Mission Brush analysis area, this would be limited to improvement of dry-site old growth; other designated old growth would continue to be managed for old-growth characteristics. This is consistent with Forest Plan direction for old-growth habitat management. There are no Forest Plan standards specific to pileated woodpeckers and old growth other than to provide for viable populations. Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

b. White-tailed Deer

Methodology

White-tailed deer critical mid-winter range was evaluated using a habitat suitability model derived from data in the Forest timber stand database (TSMRS). The potential effects on this habitat component were determined by predicting the change that would result from each alternative.

Alternative 1

The existing condition of big game habitat is directly related to disturbance factors that have influenced vegetation patterns. Since the advent of fire suppression policies, past timber harvesting has been the primary disturbance factor that has interrupted the successional creep, reinitiating the early stages of forest development and creating forage areas. The natural tendency for these open stands is to progress toward later stages of forest development that become dominated by mixed conifer trees, shading out an important forage component. Without periodic disturbance, the production of forage on a meaningful scale would be unsustainable.

Effects Common To Alternatives 2, 3 and 4

It is possible that improvements to recreational facilities in the Brush Lake area may negatively impact wildlife species that are particularly sensitive to human disturbance. However, they likely would have only minor effects upon white-tailed deer. While these upgrades may increase the number of visitors this area receives, the footprint of the recreation area at the lake would not be significantly larger. Old roads that would be converted to ATV trails are presently being used for this purpose. White-tailed deer acclimated to the present amount of disturbance at developed facilities along the lake probably would not be displaced by increased use. These proposals would not change types of recreation at the campground, and would focus the motorized activities to areas that are more suitable. Winter use of the area would not be substantially increased, so this feature of the proposed action is unlikely to increase disturbance to wintering big game.

Alternative 2

Direct and Indirect Effects

This alternative proposes timber harvest of 45 acres of critical mid-winter range. While this represents 25% of the available amount of this habitat component in the project area, portions of each of the forest blocks that make up this habitat would be left untouched. In addition, regeneration cutting of 221 acres of winter range would enhance foraging opportunities into the future. In combination with prescribed burning, Alternative 2 would improve habitat conditions for white-tailed deer.

Alternative 3

Direct and Indirect Effects

Alternative 3 would treat 41 acres of which is currently suitable critical mid-winter range. As in Alternative 2, portions of affected critical winter range stands would be left untouched. This alternative would generate less early successional forage than Alternatives 2 or 4, but would affect essentially the same number of acres of suitable critical mid-winter range.

Alternative 4

Direct and Indirect Effects

Alternative 4 would provide more modest improvements of forage conditions for deer. While this alternative would treat the same number of acres of potential critical mid-winter range (including 45 suitable acres), only 157 acres would be regenerated. As a result, treatment would convert less acres into the early stages of forest development than Alternative 2 would.

Cumulative Effects Common To Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for white-tailed deer:

Past Activities and Events – Past timber harvest in the project area has almost universally benefited white-tailed deer by increasing quality and quantity of forage in harvested areas. The proposed action would compliment past harvest activities by reversing the recent trend toward increased overstory cover on historic winter range brought on by fire exclusion. A side effect of historic logging has been the development of a system of roads that can result in direct mortality (vehicle collisions) or make deer more vulnerable to harvest during hunting seasons. However, the increasing population trend of white-tailed across the country indicates that the benefits of clearing during timber harvest and for development purposes outweighs the negative effects of associated road building.

Current Management Activities – Personal use firewood gathering, various non-motorized recreation activities, standard road maintenance, and continued fire suppression would not significantly impact white-tailed deer populations. Motorized recreation can disrupt normal use patterns, and if prolonged or concentrated can cause big game to abandon preferred habitat. However, this is probably not the case on critical mid-winter deer range, since the condition of these stands (dense conifer overstory and understory, shallow snow pack) make them undesirable to snowmobilers.

Other Restoration Projects – TSI activities, noxious weed treatments, and underburning are unlikely to have adverse impacts on white-tailed deer besides a brief disturbance event while these activities are conducted. In addition, weed treatments and underburning will improve big game forage in the future by eliminating exotic plant species that compete with more palatable native vegetation, and by rejuvenating decadent browse species and checking the spread of shade-tolerant conifers (Douglas-fir and grand fir) that shade out understory browse.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (mainly FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Conclusion

White-tailed deer are presently at historically high densities. While the proposed activities would eliminate 45 acres of critical mid-winter range, these activities would also result in improved forage quantity and quality on traditional winter range. The adaptability and prolific reproductive potential of this species make it highly unlikely that habitat degradation on a small scale would cause lasting effects. Consequently, Alternatives 2, 3, and 4 may impact white-tailed deer or their habitat, but would not likely indicate a local or regional change in habitat quality or population status.

Consistency with Forest Plan and Other Regulations

All alternatives are consistent with the Forest Plan objectives dealing with the management of big game species (USDA 1987, p. II-6). While white-tailed deer are considered a Management Indicator Species on the North Zone of the IPNF, there are no specific Forest Plan standards for deer habitat.

c. Forest Land Birds

Methodology

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.

Alternative 1

Idaho Partners in Flight (IPF) 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).

Two of these priority habitats, riparian habitat and dry ponderosa pine/Douglas-fir/grand fir forests, occur in the Mission Brush project area. Currently the long-term viability of the dry ponderosa pine/Douglas-fir habitats is at risk. According to Idaho Partners in Flight (2000), 31 species of Idaho's breeding species use this habitat for nesting.

Under this alternative, the proportion of the landscape dominated by dry ponderosa pine/Douglas-fir habitats would continue to decline. High tree densities and fuel accumulations would continue to present a risk to the survival of ponderosa pine on the drier habitats and western larch on the moister habitats. Therefore, it is unlikely that there would be a shift to old growth ponderosa pine structure conditions (representing historical vegetative patterns). Also, as stated in the "Vegetation" section, Douglas-fir trees are likely to die before reaching the old growth stage.

Consequently, this shift in species composition and susceptibility to abnormal disturbance events (stand replacing fires resulting from abnormal fuel levels) has resulted in severe modifications of the forest ecosystem and to biodiversity. The perpetuation of a homogeneous landscape dominated by Douglas-fir would decrease habitat richness and habitat diversity, thereby providing limited niches to support the diversity of land birds that occur on a forested landscape.

Alternatives 2, 3 and 4

Direct and Indirect Effects

Priority habitats would not be adversely impacted by the proposed actions. Applying Best Management practices and the Inland Native Fish Strategy (INFS) would protect and maintain riparian habitat that occurs along stream corridors (see Design Criteria and Mitigation Section). Also, a purpose of this project is to promote the restoration or enhance the structure of dry ponderosa pine/Douglas-fir forests. These alternatives would encourage the long-term stability of dry habitats by altering species composition, treating overcrowded conditions of shade tolerant trees, and include fire to provide the benefits similar to natural disturbances.

Opening the forest canopy on an otherwise monotonous landscape and managing for snags in these areas would increase landscape diversity and provide for those species that rely on more open habitat conditions (e.g. chipping sparrows,

Williamson's sapsucker, hairy woodpecker, pine siskin). Addressing current stand conditions resulting from a homogeneous landscape dominated by Douglas-fir would increase habitat richness and habitat diversity, thereby providing more niches to support land birds.

Cumulative Effects Common to Alternatives 2, 3 and 4

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for forest land birds:

Past Activities and Events - Past activities (such as timber harvest) and natural processes (such as wildfire) have generally benefited species that require openings and younger forest stands, and been detrimental to species that require dense forest canopy. Historic logging in Mission Creek and the Brush Lake fire have eliminated many large-diameter snags, to the detriment of species that rely on this habitat feature. In general, historic logging has decreased the amount or quality of dry site and riparian habitat (through clearcutting, overstory removal and riparian harvest), while more recent timber harvest have tended to maintain or improve these habitats (riparian buffers and commercial thinning in dry-site stands).

Current Management Activities – Personal use firewood gathering, various recreation activities and standard road maintenance would not significantly impact forest land birds. Continued fire suppression can have both positive and negative impacts on migratory birds. Fire suppression has contributed to high tree densities and fuel accumulations that present a risk to the survival of ponderosa pine on the drier habitats and western larch on the moister habitats. Conversely, fire suppression has also protected riparian habitats and mature dry-site forests from lethal wildfire. Where active management does not occur, continued fire suppression will retain the current homogeneous nature of the vegetation. This would result in less diversity of habitat that might benefit a greater variety of species.

Other Restoration Projects – Thinning young, small diameter trees would be designed to increase the overall health and vigor of the stands. Additionally, this thinning would improve species composition, resulting in stands that are more ecologically stable in the face of potential disturbances. For those acres treated, thinning would complement alternatives by promoting long-term stability of habitat conditions for land birds. Noxious weed treatments and underburning should improve diversity of habitat by eliminating exotic plant species that compete with native vegetation, and by helping to maintain open grown conditions in dry ponderosa pine/Douglas-fir/grand fir forests that are currently in decline.

Activities on other ownerships – The USFS is currently unaware of any planned activities on private (mainly FCP) lands within the analysis area. However, timber harvest and road building activities may take place on these and other private ownerships, as well as adjacent properties in Canada. As discussed in the Cumulative Effects Analysis introduction (above), private inholdings within the IPNF Administrative boundary are assumed not to be providing habitat for species analyzed, and adjacent properties (including lands in Canada) are not included in the cumulative effects analysis area; as the District lacks data in sufficient detail to accurately assess existing habitat, and these ownerships are highly susceptible to adverse modifications (e.g. rural developments, forest land conversions) and irretrievable alterations.

Consistency with Forest Plan and Other Regulations

While the Forest Plan does not address specific Standards or Guidelines for managing forest landbirds, 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. Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

4.7 Recreation

4.7-A. Effects common to all action alternatives

A.1- Recreation Opportunity Spectrum

Although in some areas there will be a dramatic change in the forest composition, the physical Recreation Opportunity Spectrum (ROS) will not change permanently in either the summer or winter season. Proposed road decommissioning will be done primarily on roads that have been brushed in and not useable for motorized access for many years. Therefore, there will not be an increase the amount of land offering a non-motorized recreational experience. In addition, there are no facilities upgrades or road improvement proposals that would change the current ROS setting to a more developed rating. All treatment activities and outcomes are appropriate in the Roaded Natural environment.

Socially, in the foreground, the recreational experience will be diminished to a degree for the length of the proposed activities. An increase in sights and sounds of work activities in addition to truck traffic may disturb the generally quiet and remote character of the lands in the analysis area. Dispersed camping sites may not be as available as is typical. Roadside activities such as berry picking and firewood gathering may be interrupted temporarily. The social experience will likely return to its present condition after activities are complete. As experienced from the mid-range and distance, project activities will not affect the social recreational settings

Should harvest activities occur during the winter season, the social setting will change more dramatically; but, due to the type and amount of recreation that occurs during the winter season, very few Forest visitors will be adversely affected. The social setting, for winter, will return to its current characteristic at the end of project activities.

4.7-B. Forest Plan Consistency

All proposed activities meet Forest Plan Recreation guidelines.

4.7-C. Current and Desired Future Conditions

C.1- Developed Sites

There will be no increase or decrease in the number of developed recreation sites within the planning area. Proposed harvest and road activities around the Brush Lake developed site are essentially the same for each action alternative and will affect the recreation experience in the same manner.

- Proposed recreation projects at Brush Lake are the same for each alternative.
- Road access to Brush Lake will be improved and will complement the desired future condition for the Brush Lake facilities.
- “Off-Site” Ponderosa pine will be removed thereby removing the safety hazards associated with having a campground and picnic facility in a dead or at risk timber stand.
- Due to the amount of pine proposed for removal, the landscape surrounding Brush Lake will be open. There could be several consequences relating to the change in vegetation.
- There will be vastly increased opportunity for cross-country motorized use. Resulting damage could be significant.
- The openness of the landscape could encourage a significant increase in dispersed camping-sites.
- Should harvest activities take place during the high use recreation season, forest visitors to Brush Lake will experience physical and audible disruption.

C.2- Trails

Mission Mountain Trail #156 will be protected in each action alternative. The effects of the proposed activities changes alternative to alternative.

Historic trails in the Hall Mountain area were analyzed for recreation potential with each alternative. The effect of the proposed activities changes alternative to alternative. The Wildhorse Trail will be protected in each alternative.

With each alternative existing roads and temporary roads will be considered and evaluated for suitable ATV access. ATV trail systems will be designated.

There will be no change in the winter trail experience because of any proposed activities.

C.3- Dispersed Recreation

Generally, roads and roadside recreational activities would be affected only on a temporary basis. Should harvest activities occur during the high use seasons, recreational visitors could expect short delays or increased traffic along haul routes. It is possible that several of the roadside campsites would be inaccessible during the life of the sale, but they will not be eliminated or changed dramatically. Should harvest activities take place during the winter season there may be increased access for snowmobiling and winter play. That access would remain for the time that the roads are plowed. As the proposed activities terminate, the winter access would return to its current level.

a. Alternatives 2 and 3

Alternatives 2 and 3 affect the Mission Trail #156 and the historic trails around Hall Mountain in a similar manner.

Mission Trail #156: Proposed Units 66 (seed tree treatment), 69 (irregular shelterwood treatment), 111 (seed tree), and 112 (seed tree) border or encompass the Mission Mountain Trail. Due to the type of treatments proposed the trail would be affected. The trail currently meanders through an essentially forested environment. Treatment activities would remove most of the overstory. The trail tread would be protected as stated above; however, fireweed and fast growing brush would obscure the trail within a couple of years. Mature trees, healthy or not, help delineate the trail corridor. Treatment activities are proposed over more than half the length of the trail.

Historic trails: The historic Hall Mountain trail passes directly through proposed Unit 38. The trail is currently difficult to follow. Treatment activity could eliminate any sign of the trail. Approximately ¼ to ½ mile of trail is affected.

b. Alternatives 2 and 3 in Comparison to Alternative 4

In addition to the effect to trails, Alternatives 2 and 3 affect the general recreation environment similarly in that they create a greater disturbance over a broader area than Alternative 4. The disturbance would be temporary and the recreation environment would return to its current state at the end of project work.

4.8 Required Disclosures

4.8-A. Irreversible and Irretrievable Commitment of Resources

Irreversible effects are defined as the loss of future options. They result from a decision to use or modify resources that are not renewable, or are renewable only over a long period of time. Such commitments apply primarily to the effects of using nonrenewable resources, such as minerals or cultural resources, or to factors that are renewable only over long periods, such as soil productivity.

Irretrievable effects apply to the loss of production, harvest, or use of natural resources. They occur when use of a renewable resource is lost due to land allocation decisions or in scheduling management activities. If the allocation or schedule changes, it would be possible to resume production.

These commitments were considered for the following resources within the Mission Brush project area.

a. Vegetation
The loss of production or use of natural resources can be considered an irretrievable loss. If an alternative includes cutting of a low level of dead and dying trees, future decisions could increase the amount of cutting. However, dead trees not utilized now would deteriorate and not be available in the future and that output would be “lost.”

b. Soil Productivity Water Quality
Best Management Practices and other Design Criteria (see Chapter 2) would be used to avoid soil productivity losses from timber harvesting and associated road or skid trail construction. Temporary roads proposed in Alternatives 2 and 4 would be decommissioned / obliterated at the end of post-sale activities. There would likely be small, localized areas of sterilized soils where severe burning occurs, such as slash piles. These actions would be irretrievable losses in productivity.

c. Wildlife
The loss or modification of habitat for certain wildlife species is irretrievable. As vegetation recovers, or the effects of other disturbance lessens (such as from a wildfire) the habitat would recover. However, the time frame for this to occur may be as long as several decades.

d. Water Quality
Best Management Practices and other design criteria and mitigation items would be effective in avoiding irreversible and irretrievable effects on water quality and aquatic habitats.

e. Heritage Resources
Disturbance of any heritage resource is an irreversible commitment; the project design criteria have been developed to avoid effects to these resources.

f. Visual Quality
Some irretrievable changes in the appearance of the landscape would occur under the Action Alternatives. The sense of change would depend upon the viewing distance and the sensitivity of the person looking at the area. The change would become progressively less noticeable as vegetation recovers in harvested areas and next to developments such as the recreation facilities at Brush Lake.

g. Air Quality
Prescribed burning and dust from traffic and logging operations would have some temporary seasonal impacts on air quality in all alternatives except Alternative 1 - No Action.

4.8-B. Unavoidable Adverse Environmental Effects

Implementation of any of the alternatives, even Alternative 1 – No Action, would inevitably result in some adverse environmental effects. The degree of effects would be minimized by adhering to the design criteria for this project, such as the Best Management Practices, Forest Plan standards and guidelines, and project-specific mitigation measures, and monitoring. Many adverse effects can be reduced, mitigated, or avoided by limiting the extent or duration of effects.

a. Vegetation
Acres not proposed for vegetation treatments that are at high risk of insect and disease or fire would experience adverse effects if tree mortality or a wildfire occurs.

b. Soil Productivity

The alternatives will comply with the Forest Service Manual and Regional Soil Quality Standards concerning detrimental impacts to the soil. Skid trail distance would average 100 feet on ground-based and cable-yarding units, except where the trails converge and as terrain dictates otherwise. This measure would help assure that no more than 15 percent of the activity area would be detrimentally disturbed (Region 1 soil standards.)

All but Unit 16 have existing skid trails less than 15 percent detrimental compaction (Region 1 standard) The surplus old skid trails will be rehabilitated and would move the Unit towards a net improvement in soil quality. As mitigation to reduce soils concerns, proposed Units 57 and 62 would be treated in the winter over snow or a slash mat or skyline yarded. These measures will lessen the risk of losses in soil productivity.

c. Wildlife
The harvest of trees would result in a loss of nesting sites for some species of birds. Other wildlife species might be displaced or disturbed by human activity under Alternatives 2, 3, or 4. Removal of dead trees would reduce the amount of trees and snags available to some wildlife species; however, the levels of remaining snags and replacement trees would mitigate any adverse effects.

d. Recreation and Visual Quality
Road construction, road maintenance, and logging operations would temporarily affect aesthetics and public use of some areas. Design criteria and mitigation measures have been developed to reduce adverse effects to these resources.

e. Noxious Weeds
Any activity carries the risks of introducing or spreading weeds. Mitigation measures such as washing logging and construction equipment, closing temporary roads, and seeding disturbed areas would help reduce but not totally eliminate the risk of spreading weeds. Weed infestations are, and will continue to be, treated under the direction of the Bonners Ferry Noxious Weed Control Final EIS and Record of Decision.

f. Air Quality
Road construction, slash disposal and preparation of areas for tree planting, as well as road dust could result in temporary seasonal impacts to air quality. However, design criteria and mitigation measures would reduce or avoid effects. No prescribed burning or slash disposal would be initiated during times when air quality restrictions are in place.

4.8-C. Relationship between Short-term Uses and Long-term Productivity

Short-term uses generally determine the present quality of life for the public. The current activities must not impair long-term productivity. Long-term productivity of the land refers to its capability to provide resources such as timber, high quality water, and forage.

a. Vegetation
The capability of the land to produce timber, high quality water, and forage would not be impaired by any of the action alternatives. Silvicultural treatments would reduce competition and improve growth of individual trees, and maintain the health and vigor of timber stands, thus enhancing long-term productivity of the area. In the short-term, harvesting stands at high risk of mortality would utilize commercially valuable wood products that would otherwise not be used as forest products. Reforestation would contribute to maintaining these lands in a productive state.

b. Aquatics
Under the action alternatives, road construction, culvert replacement, and decommissioning may temporarily introduce a small amount of sediment into streams. The long-term benefits of culvert replacement and road decommissioning would reduce the amount of sediment reaching streams; over time increasing water quality and improving habitat conditions for fish.

c. Wildlife
The number of snags to be left for wildlife and other benefits is determined by a protocol based on the best available information on the appropriate size, species, and numbers of snags needed for wildlife, and the snags that can be protected during harvest activities. The short-term need to protect snags from wildfire through reduction of wildfire risk has been addressed by the fuel treatment features of the alternatives. Disturbance to wildlife during project implementation would be minor and short-term due to restrictions on public use of designated roads.

d. Air Quality
The Forest Service would voluntarily cease prescribed burning activities when necessary to avoid violation of Airshed agreements and State air quality standards. Prescribed burning of fuels and logging slash would take place primarily in early spring when air quality and weather patterns are more conducive to better air quality. During other times of the year activities such as agricultural field burning, slash burning on private forest lands, use of wood stoves, and dust from the Palouse and Columbia Basins can compete for use of monitored airsheds

4.8-D. Possible Conflicts with Other Federal, State or Local Policies, Plans or Regulations

There would be no conflicts with any Federal, State or Local Policies, Plans or Regulations. Compliance with applicable laws is discussed in Chapters 2 and 4 where appropriate.

4.8-E. Other Required Disclosures

a. Environmental Justice Act

Executive Order #12898 requires federal agencies to conduct activities related to human health and the environment in a manner that does not discriminate or have the effect of discriminating against low-income and minority populations.

The communities nearest the project area are the small, unincorporated towns of Eastport and Porthill, about eight and six miles respectively from the closest part of the project. These communities were included in the releases of information to the public. The Open Houses were held at the Mount Hall Elementary School as another way to provide residents closest to the project area with opportunities to participate in the NEPA process.

Porthill and Eastport are international border crossings between the United States and Canada; thus the largest employer is likely federal agencies (Customs and Immigration Service, Border Patrol, Department of Homeland Security, and Postal Service). The border crossing at Eastport is open 24-hours per day, Porthill is open daily from 7:00 a.m. to 11:00 p.m. Small privately owned businesses at Eastport include about six customs brokerage offices, Burlington Northern-Santa Fe Railway, one reloading yard for freight transfers between trucks and railcars, and the nearby PGE/PGT natural gas transmission pumping station. Porthill has one Duty-Free store that sells only specific items (such as perfume and alcohol) to visitors traveling between the two countries. A Duty-Free store has been open intermittently in Eastport.

There is no specific demographic census data for these communities. Data for Boundary County as of the 2000 census year shows the population is 93.2 percent white, not of Hispanic/Latino origin; 3.4 percent persons of Hispanic or Latino origin; 2.0 percent persons of American Indian and Alaska Native origin; Black or African American, Asian, Native Hawaiian and Other Pacific Islanders each represent less than 1 percent of the population.

Human health and environmental effects of the proposed activities are concentrated on National Forest System Lands and are not anticipated to spread beyond the project area. All contracts that would be offered by the Forest Service to implement project activities would contain Equal Employment Opportunity requirements.

Based on experience with similar projects on the Bonners Ferry Ranger District, none of the alternatives would substantially or disproportionately affect minority or low-income individuals, women, or civil rights. The implementation of this project is expected to provide job opportunities in communities within Boundary County and the surrounding areas. Some of these communities include minority populations that may benefit from the economic effects. Small or minority-owned businesses would have the opportunity to compete for some of the work. See the project file for information on minority groups and income levels in Boundary County, provided by the most recent census (2000).

b. American Indian Religious Freedom Act
Consultation with the Kootenai Tribe of Idaho is ongoing to determine if there are anticipated effects to their social, economic or subsistence rights.

c. Prime Farmland, Rangeland, or Forestland
None of the activities would occur upon or adversely affect prime farmland or rangeland. National Forest Systems lands are not considered prime forestland.

d. Effects to Floodplains and Wetlands
The Inland Native Fish Strategy (INFS) standards and guidelines implemented with this project would protect floodplains and wetlands.

e. Incomplete or Unavailable Information
Past timber harvest and road construction activities on National Forest System lands and private lands within the project area - As stated in the Appendix A discussions of past activities, various pieces of information are incomplete or unavailable. The relevance of the incomplete or missing data depends on what is lacking. For instance, the name of a particular sale would be of little value in evaluating the environmental effects of the harvest. For many elements of past activities, knowledge is gained through field visits, interpretation of aerial photos, or both. Note that past actions are reflected in the current condition of the project area to the extent that they are still affecting the particular resource being analyzed; thus, the effects of past actions are accounted for in the assessment and description of the existing conditions. See Appendix A section A.3-a for more information.

f. Energy Requirement and Conservation Potential of Alternatives
The energy required to implement this project would not vary by any significant amount between alternatives. The amount and cost of petroleum products that would be used is insignificant when viewed in light of overall production costs and the effect on national or worldwide petroleum resources. Opportunities for further conservation of energy sources/petroleum products would be very limited.

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List of Preparers

The following individuals participated in the response to and documentation of the new information related to the Final EIS and preparation of the Supplemental Mission Brush Environmental Impact Statement.

Doug Nishek -- Forester, Interdisciplinary Team Leader
Pat Behrens – District Silviculturist
Gina Rone -- IPNF, Soils Scientist
Brett Lyndaker -- Wildlife Biologist
Rick Patten – IPNF, Hydrologist
Chris Savage – Hydrologist
Chad Baconrind – Fisheries Biologist
Shanda Dekome – IPNF, Fisheries Biologist
Maridel Merritt – Writer/Editor
Mike Herrin – District Ranger
Spike Loros -- Document Display Specialist and GIS Analyst

The Supplemental Final EIS has been mailed to individuals, agencies and organizations that expressed an interest following release of the Supplemental Draft EIS in 2005, as follows.

Boundary Backpackers
Boundary County Commissioners

Craig, Senator Larry

Ecology Center, The

Gause, David

Idaho Conservation League
Idaho Dept of Enviro Quality – Boise, Coeur d'Alene
Idaho Dept of Fish & Game – Bonners Ferry, And Coeur d'Alene
Idaho Panhandle National Forests Supervisor's Office

Keough, State Representative Shawn
Kootenai Environmental Alliance
Kootenai Tribe of Idaho

Lands Council, The

Morris, Charlotte

Northern Lights, Inc.

Otter, C.L. Representative

Sedler, Liz
Selkirk Conservation Alliance
Siebenthaler, Dave

U.S. Dept of Interior, Fish & Wildlife Service - Spokane, Washington
U.S. Dept of Interior, Office of Environmental Affairs – Washington, D.C.
U.S. Dept of Agriculture, Forest Service – Washington, D.C.
U.S. Dept of Agriculture, National Agricultural Library
U.S. Environmental Protection Agency – Seattle, Washington and Washington, D.C.

The following parties were notified that the Supplemental Final EIS is available for public review and that they can request a copy, or access it online at the Idaho Panhandle National Forests website.

Alliance for the Wild Rockies
American Wildlands – Bozeman, MT and North Idaho Field Office

Chamber of Commerce – Bonners Ferry, Idaho

Forest Capital – Bonners Ferry, Idaho

Hall Mountain Water Association

Idaho Dept of Lands – Bonners Ferry, Idaho

Idaho Sporting Congress

Idaho Women in Timber

KSPT/KPND Radio

Langness, Linda & Lew

Mission Creek Water Association

Riley Creek Lumber Co. – Moyie Springs, Idaho

Scott, Duane