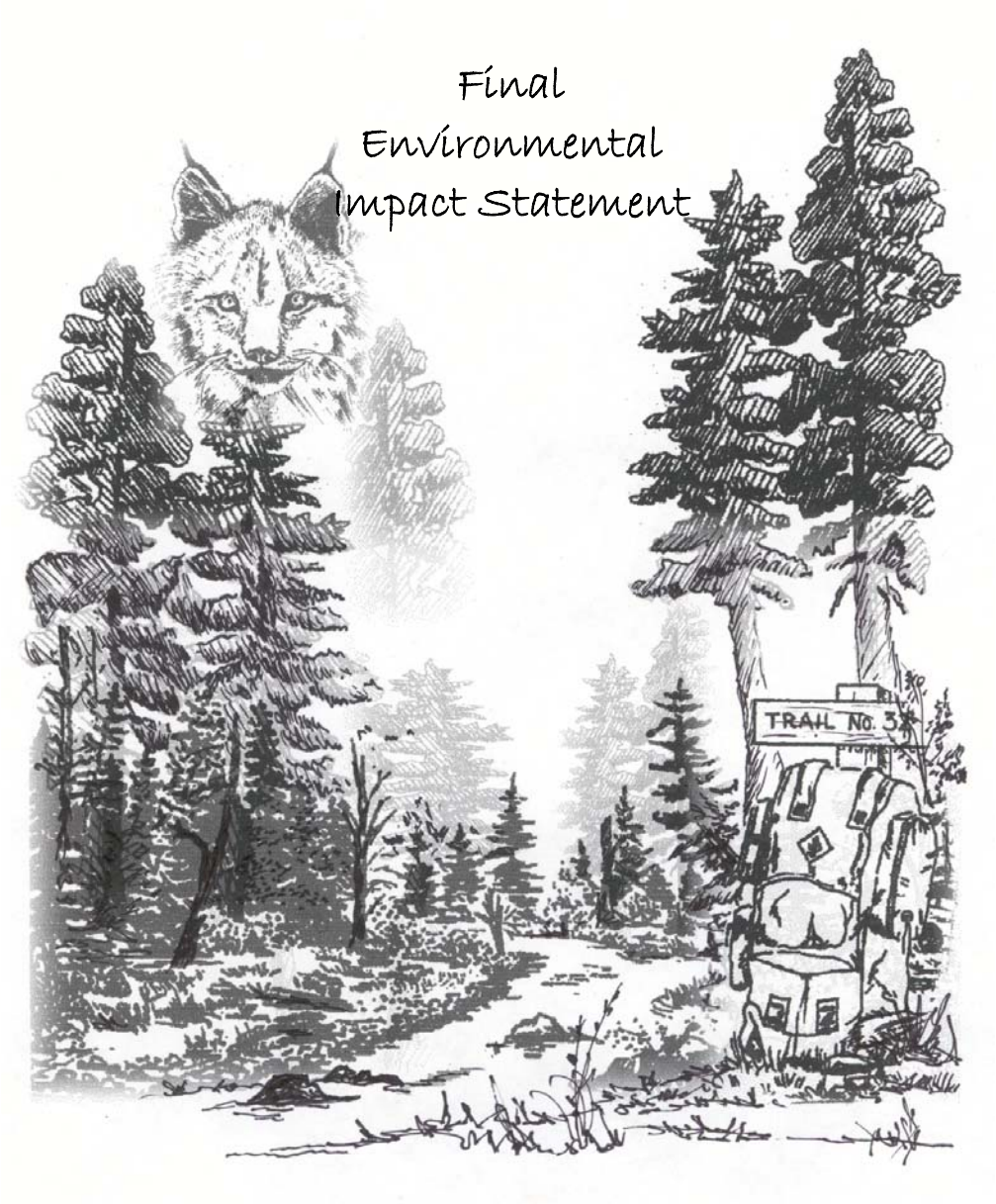
United States
Department of Agriculture

Forest Service
Northern Region
Idaho Panhandle National Forests

Mission Brush

Final Environmental Impact Statement



May 2004 Bonners Ferry Ranger District

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

Mission Brush
Final Environmental Impact Statement

May 2004

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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, improve 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.

Four alternatives were developed in response to the major issues identified by the public and team members. Alternative 1 (No Action) would defer all activities that are not part of current management. Alternative 2 (modified Proposed Action) includes vegetation treatments on approximately 4036 acres, Alternative 3 treats about 3325 acres, and Alternative 4 treats about 3073 acres. Access will be provided through the existing road system; no new permanent roads are proposed. Road improvements, storage and decommissioning are designed to reduce the entry of sediment into the aquatic system. Upgrading the recreation facilities and trails near Brush Lake are essentially the same for all action alternatives. **Alternative 2 is the preferred alternative.**

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 the following URL: http://www.fs.fed.us/outernet/ipnf/eco/manage/nepa/index.html

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.

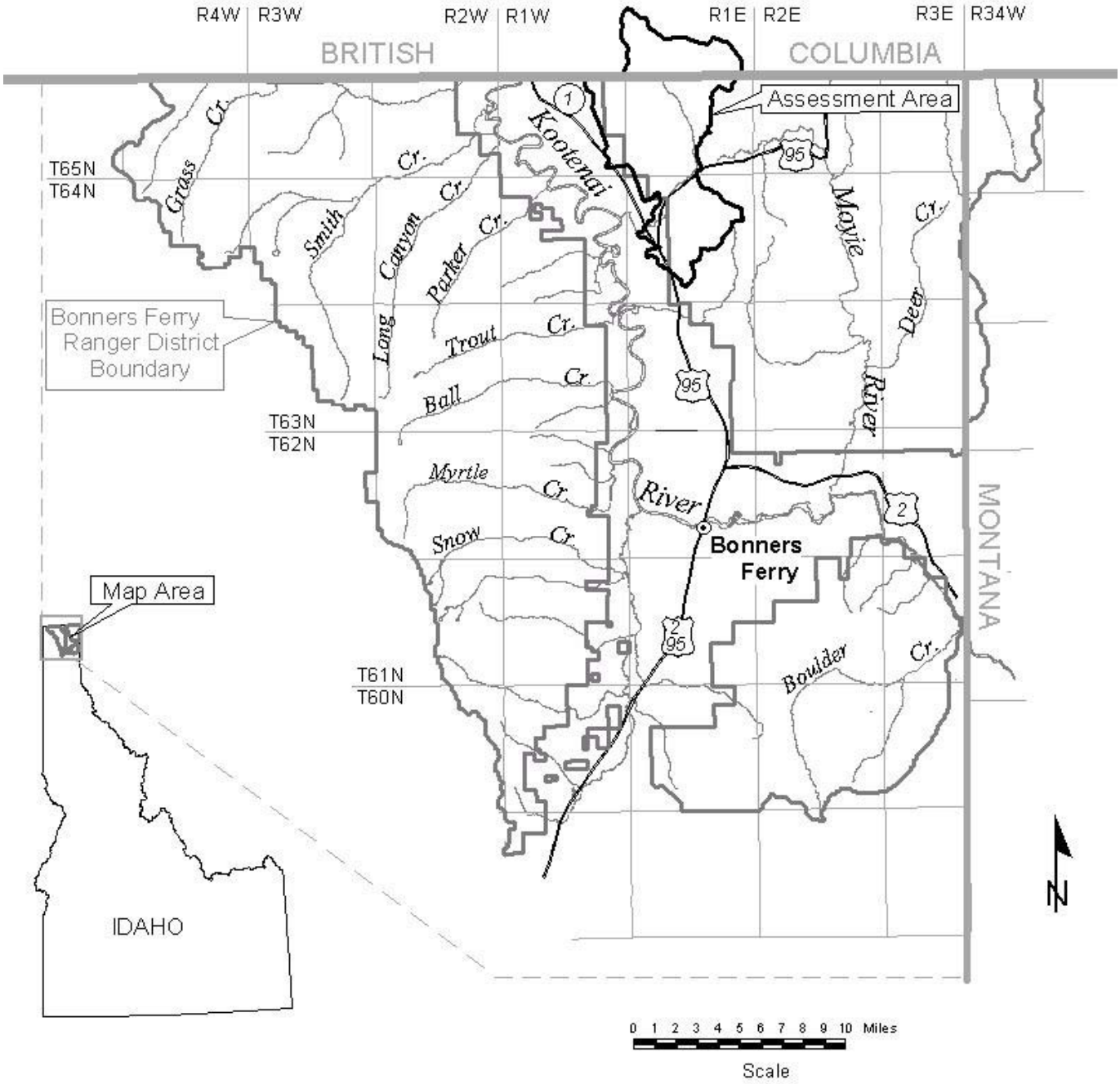
Wildlife in the project area includes elk, white-tailed deer and mule deer, mountain goat, moose and black bear. The project area intersects designated habitat for the Canada Lynx. Effects of the proposed restoration activities in Lynx habitat are analyzed in detail in this EIS.

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))

Figure 1-1

Mission Brush DEIS Assessment Area Vicinity Map



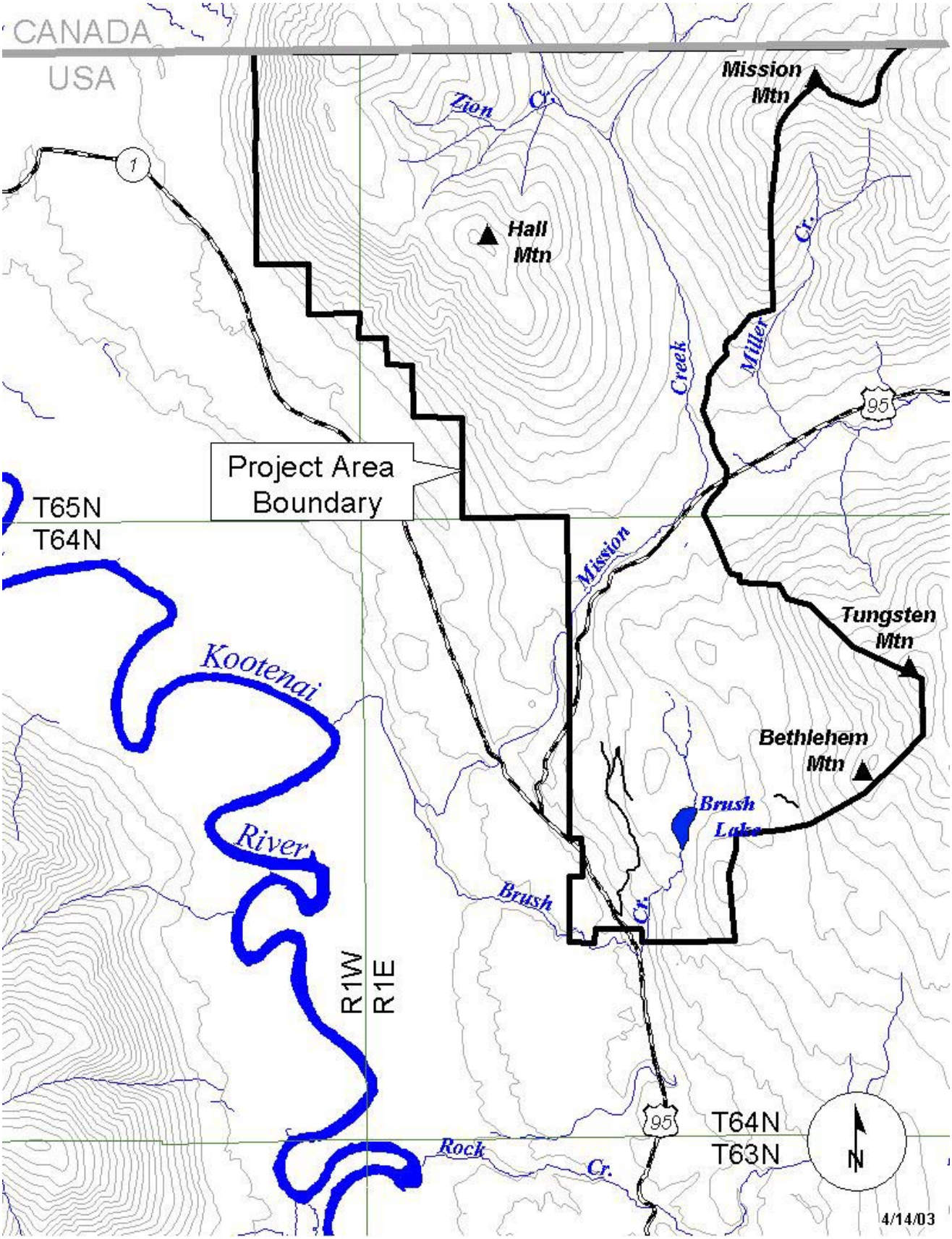


Figure 1-2. Mission Brush Project Area

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.

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 similar to historic levels that resist insects, diseases, and stand-replacing wildfire(s). Improve landscape patterns by creating openings that more closely resemble those that occurred historically.

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.

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 significantly 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.

C. Wildlife Habitat

- Promote the long-term persistence and stability of wildlife habitat and biodiversity by trending toward an ecosystem composed of vegetation that more closely resembles the historic range of variability. The project area contains stands that are relatively similar in size and age, and therefore, not providing 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.

D. Recreation

Provide recreation facilities that are safe, meet universal accessibility requirements, and meet future needs while retaining the rustic nature of the area and improving 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.

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

Information from a number of scientific assessments were 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.

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.

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 restoration with timber sales. Aquatic restoration should be focused on specific needs based on the zone aquatic restoration strategy," (Northern Region Overview Summary, USDA October 1998, p. 9).

The Overview goes on to state, "The timber management (timber harvest) tool best fits with the forest types in northern Idaho and is essential, for example, to achieve the openings needed to restore white pine and larch, and maintain upland grass/shrub communities. It can enhance terrestrial/watershed objectives where timber funds are used to close and improve roads. Aquatic restoration could tie with assessing road access needs and obliteration of nonessential [roads]" (Northern Region Overview Summary, USDA October 1998, p. 33).

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.

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 forest types; provide the opportunity for much needed western white pine restoration.

D. Vegetation - Historic Range Of Variability

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 point 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. Simply put, this information tells us:

- Where we have been.
- Where we are now.
- Where we want to go.

The vegetative component of the North Zone Geographic Assessment defines forests in the Mission Brush project area as "Low Integrity/High Risk Landscapes." Findings that relate to the forest stands in 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.

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, 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.

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.)

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.

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.

1.4 Desired Future Conditions

A. Vegetation

Analysis of the various ecosystem components in the project area revealed wide scale trends of departure away their respective HRV. Particularly with the vegetation composition and structural components. These landscape-wide trends are often outside their HRV and represent risks with respect to the long term overall health, function and resilience of the forest ecosystem, including aquatic and wildlife components. To varying degrees, they can also affect social and economic factors such as the risk of wildfire in the wildland / rural interface, and undesirable changes in recreation opportunities. The desired future conditions (DFC) for the vegetation component are linked to the trends and inherent risks of allowing the trends to continue away from HRV.

The desire is to trend the forest vegetation toward composition and structure levels that existed historically within the HRV. Specifically:

- 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.

Figure 1-3. Picture of Unhealthy Stand Conditions

Figure 1-3, taken in the project area, illustrates the hazardous fuel loadings and ladder fuels found in our valuable mature and dry site old growth stands. It is an example of overcrowded and unhealthy stand conditions, well outside the HRV. Historically, this area included a greater percentage of stands that were open-grown, and featured shade-*intolerant* species, and were more adapted to the historic fire regime.
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 the historical conditions. The project area contains stands that are relatively similar in size and age, and therefore, not providing a wide range of wildlife habitats. Improving the diversity of forest structures in the area, including larger patch sizes with less fragmentation will, in turn, provide for wildlife, fish, and plant habitat diversity.

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 future characteristics of our drier forest types. With fewer trees per acre in a more open structure, the stand is within the HRV; therefore, 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.

B. Aquatics

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.

Hall Mountain

The Desired Future Condition 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 concentrate water and trigger these events. These have occurred both 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.

C. Wildlife

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 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.

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.

1.5 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."

Our proposal for management in the Mission Brush project area includes vegetation restoration treatments in 57 Units, totaling approximately 4036 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 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 10 miles of currently undriveable roads will be decommissioned as illustrated in Figures 2-9 and 2-10.

A. Scope of the Analysis

The Mission Brush EIS analyzes the environmental effects of the proposed action within the assessment area and 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.

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 following list of items. 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.

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 (which is presently considered an 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.

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 also described in Chapter 4.

- Other restoration projects - noxious weeds monitoring and treatment, native seeding and timber stand improvement (tree thinning and pruning in plantations).
- Bonners Ferry Salvage Sales EA
- Timber harvest on private lands and within the Canadian portion of Mission Creek watershed
- US Highway 95 Realignment
- 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 2).
- The Northern Prairie EA.

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.

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)

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)

Forest Service Policies and Regulations

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.

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.

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.

C. 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.

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," (INFS page A-4.)
The Mission Brush project area is comprised of lands in Management Areas and Riparian Habitat Conservation Areas.

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).

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 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.

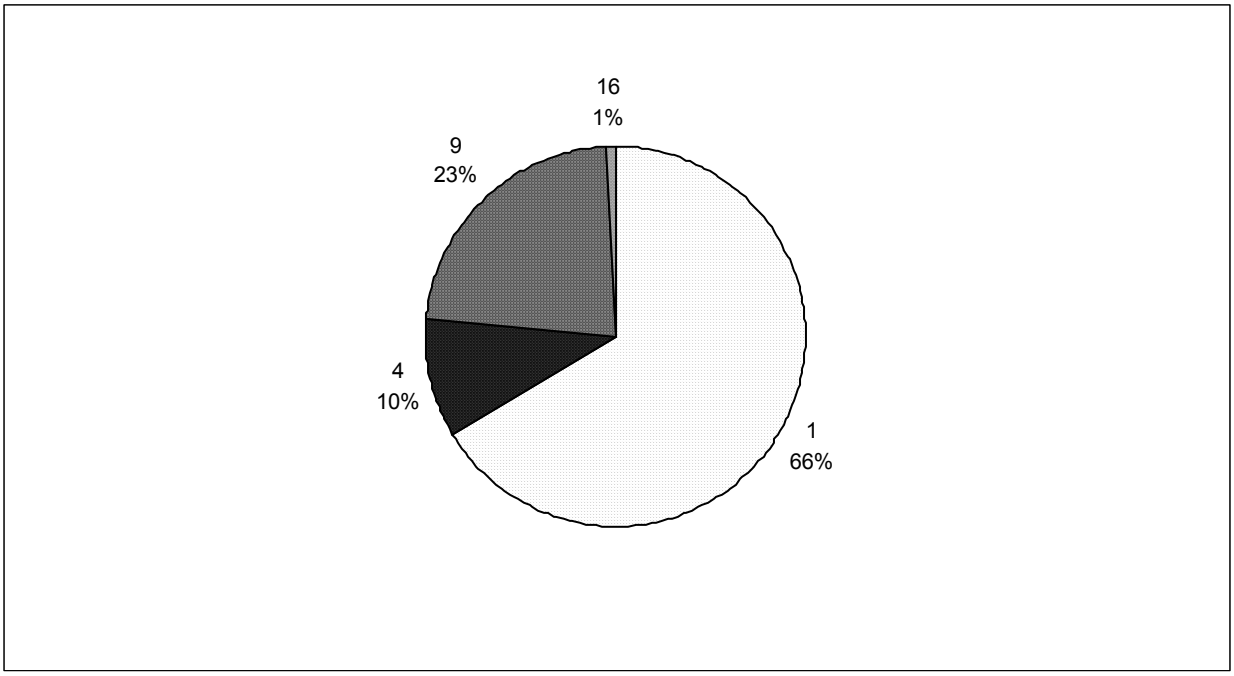


Figure 1-4. Mission Brush Project Area MA Designations

1.6 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

This chapter discusses alternative driving issues and lists the other issues that were analyzed, but did not warrant the development of separate alternatives. It also contains a description and a general comparison of the alternatives considered in detail and a brief discussion of three other alternatives that were considered, but eliminated from further study. The desired condition, purpose and need statements, and management area objectives identified in Chapter 1, in conjunction with the issues outlined in this chapter, provided the framework from which the alternatives were developed. All acres listed in the discussions, tables, and figures, for each of the alternatives in this chapter are approximate.

2.1 Public Involvement

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.

Public Involvement Efforts

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, 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.

Public Review of the Draft EIS

The Mission Brush Draft Environmental Impact Statement (DEIS) was made available for public comment on August 22, 2003. This chapter summarizes the public involvement activities following release of the DEIS. It also contains clarifying documentation for various resources to assist the decision-maker and the public in understanding and tracking issues and comments associated with this project. The full text of substantive public comments on the Draft EIS and the agency's responses are located in Appendix I – Response to Comments.

Internal review of the DEIS indicated a need to clarify the discussions on forest openings, as well as current forest health and status/risk of insect infestations and root diseases in the forest vegetation, and unroaded areas in the vicinity of the proposed activities. Public review and comments did not disclose any new major issues or need for new, significant analysis.

Changes to Alternatives between Draft and Final EIS

In response to recent decisions with implications for this project, and through internal review of the project, the following changes have been made to the proposed activities and analysis for the FEIS.

<u>Vegetation</u>
Internal review resulted in one minor change, as follows:

In all action alternatives, Unit 20 was reduced from 64 acres to 26 acres for goshawk nest protection. For details, see the Northern goshawk discussion beginning on page 4-74.

<u>Recreation</u>
About one-half mile of the Ardnt Trail (overall length of nine miles) lies within the Mission Brush Project Area. Recreation proposals included reestablishing trail tread at the junction of Mission Mountain Trail #16 and Ardnt Trail #409 (DEIS, page 2-14). Since release of the DEIS, the rehabilitation of Ardnt Trail

#409 has been analyzed separately in the Ardnt Trail Rehabilitation Decision Memo (DM 1/13/04). The potential effects to Canada lynx and grizzly bear have been analyzed and disclosed in discussions beginning on page 4-57.

Wildlife
In March 2004, the USFS issued the ROD for the Forest Plan Amendments regarding motorized access in the Selkirk and Cabinet-Yaak Recovery Zones (USFS 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.

2.2 Alternative Driving Issues

This section describes the driving issues also known as key or principal 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.

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, they would tend to be healthier.

The North Zone Geographic Assessment (NZGA, draft in progress) defines forests in 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 Alternative Driving Principle Issues and Indicators: Forest Vegetation

Principle Issue	Principle 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 the issues through the effects analysis in Chapter 4.

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

Principle Aquatics Issue	Principle 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 Cr and Brush Cr watersheds. Total estimated sediment (tons) delivered over the duration of the project in Mission Cr and Brush Cr 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 Brushy Mission project, based on known species distribution and habitat availability.

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

Species	Indicator
Canada lynx	Changes to key habitat components (denning, unsuitable habitat)
Grizzly bear	Changes in 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
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 Management Indicator Species analyzed in the project area.

	No detailed discussion and analysis is necessary for species or habitat presumed not to be present within the affected area. The rationale for no further analysis for these species can be found in the project file.	Supporting rationale is presented in this section for those species that are presumed to be present but not necessarily affected by the proposed actions. No detailed discussion and analysis is necessary.	Species considered present and potentially affected by the proposed actions are carried forward into a detailed discussion and analysis in Environmental Consequences Section.
Threatened and Endangered Species			
Bald eagle (*Haliaeetus eucocephalus*)	X		
Northern gray wolf (*Canis lupus*)		X	
Grizzly bear (*Ursus arctos horribilis*)			X
Woodland caribou (*Rangifer tarandus caribou*)	X		
Canada lynx (*Lynx canadensis*)			X
Sensitive Species			
Flammulated Owl (*Otus flammeolus*)			X
Black-backed Woodpecker (*Picoides arcticus*)			X
Harlequin Duck (*Histrionicus histrionicus*)	X		
Northern Goshawk (*Accipiter gentilis*)			X
Peregrine falcon (*Falco peregrinus anatum*)	X		
White-headed woodpecker (*Picoides Albolarvatus*)		X	
Common Loon (*Gavia immer*)		X	
Fisher (*Martes pennanti*)			X
Wolverine (*Gulo gulo*)		X	

Table 2-4. Management Indicator Species analyzed in the project area - Continued

	No detailed discussion and analysis is necessary for species or habitat presumed not to be present within the affected area. The rationale for no further analysis for these species can be found in the project file.	Supporting rationale is presented in this section for those species that are presumed to be present but not necessarily affected by the proposed actions. No detailed discussion and analysis is necessary.	Species considered present and potentially affected by the proposed actions are carried forward into a detailed discussion and analysis in Environmental Consequences Section.
Sensitive Species continued			
Northern Bog Lemming (*Synaptomys borealis*)	X		
Townsend's Big-eared Bat (*Corynorhinus townsendi*)		X	
Coeur d'Alene Salamander (*Plethodon vandykei idahoensis*)		X	
Northern Leopard Frog (*Rana pipiens*)		X	
Boreal Toad (*Bufo boreas*)		X	
MIS and Others			
Pileated Woodpecker (*Dryocopus pileatus*)			X
Rocky Mountain Elk (*Cervus elaphus nelsoni*)		X	
White-tailed Deer (*Odocoileus virginianus*)			X
Marten (*Martes americana*)		X	
Forest land birds			X
Snag Habitat		X	

From the list in Table 2-4 the following species (or their habitats) are considered present and possibly affected in a measurable way by the proposed actions and will be carried forward into Chapter 4:

Grizzly Bear
Canada Lynx
Black-backed woodpecker
Northern goshawk
Fisher
Pileated woodpecker
White-tailed deer
Forest land birds
Flammulated owl (includes white-headed woodpecker as a guild)

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 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 2-5 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

2.3 Other Resource Concerns

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.

A. Biodiversity

- Biological Factors
  - Noxious Weeds
- Threatened Endangered, Sensitive; Management Indicator Species
  - Wildlife (species not discussed in Chapters 2, 3 and 4)
  - Fish (species not discussed in Chapters 2, 3 and 4)
  - Plants (species not discussed in Chapters 2, 3 and 4)
- Linkages
- Range

B. Social/Economic Factors

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

2.4 Alternatives Considered but Eliminated from Further Study

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

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 this alternative and further analyzed; it is discussed in detail throughout the EIS.

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.

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.

2.5 Alternatives Considered in Detail

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.

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.

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 4036 acres.
- Fuels treatments would occur in 57 units, totaling 3900 acres.
- 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 4.5 miles.
- Existing roads to be decommissioned total 13 miles.
- Road maintenance would be done on a total of 39 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.

Figure 2-1. Brush Lake Facilities Layout

Figure 2-1 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 proposed Watchable Wildlife Trail, and new larger dock.

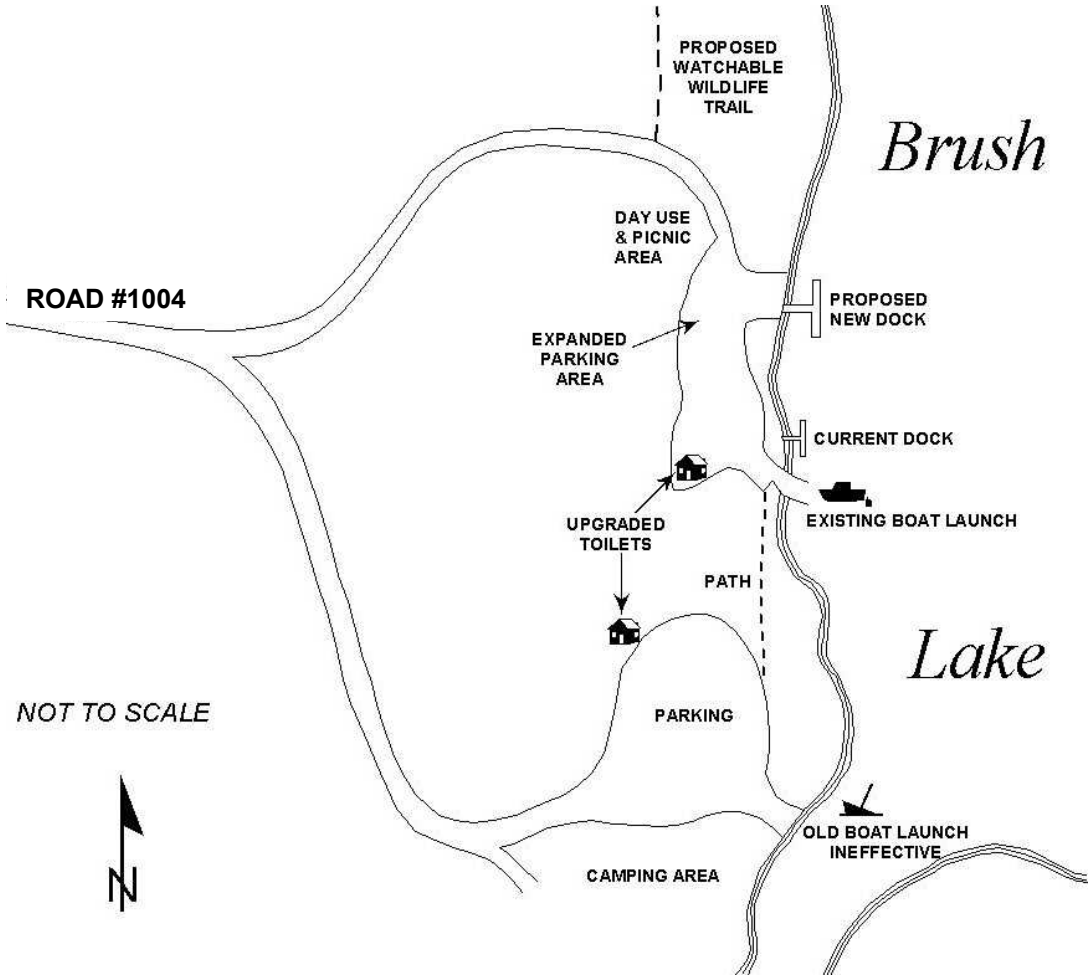


Figure 2-2. Recreation Area Designations

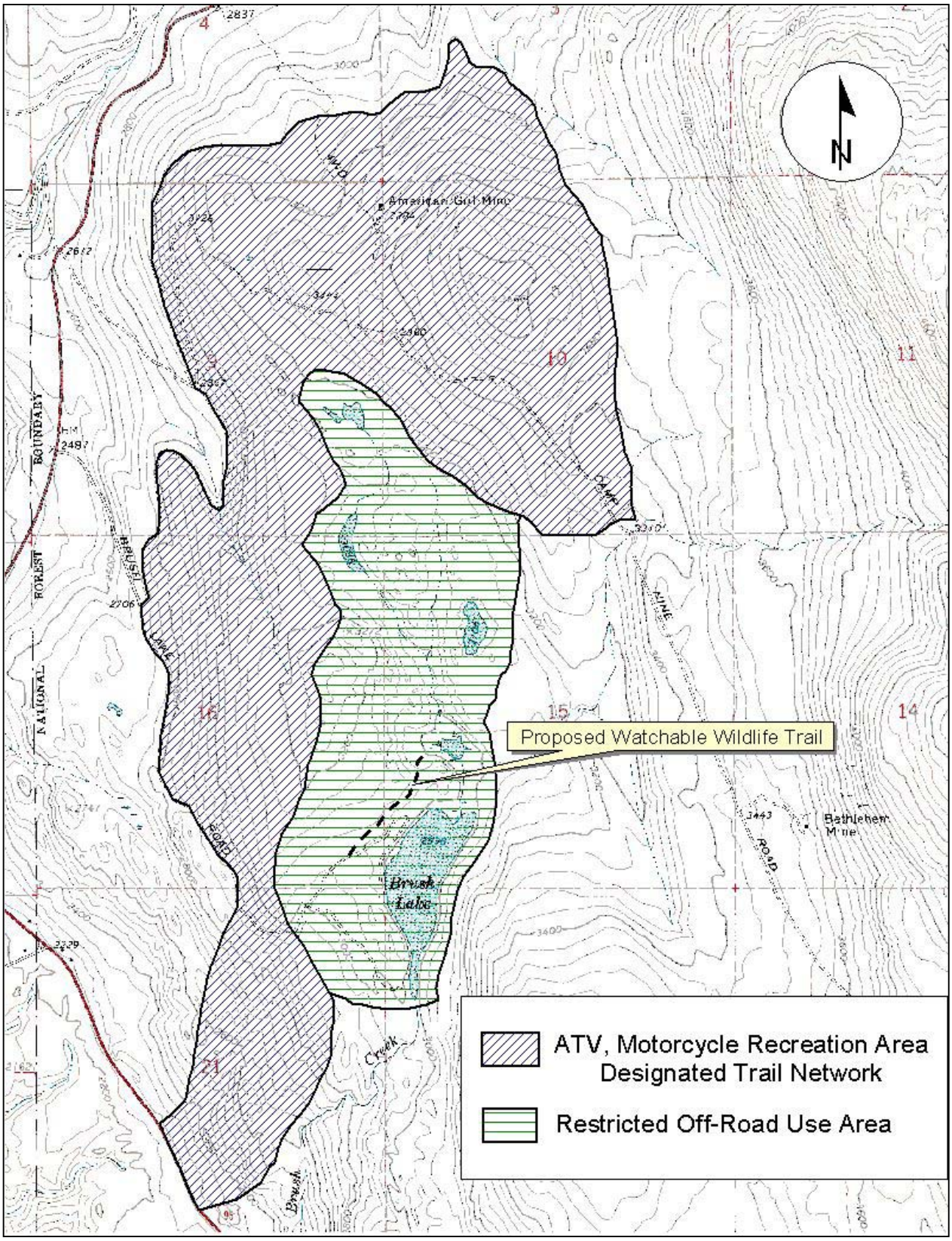
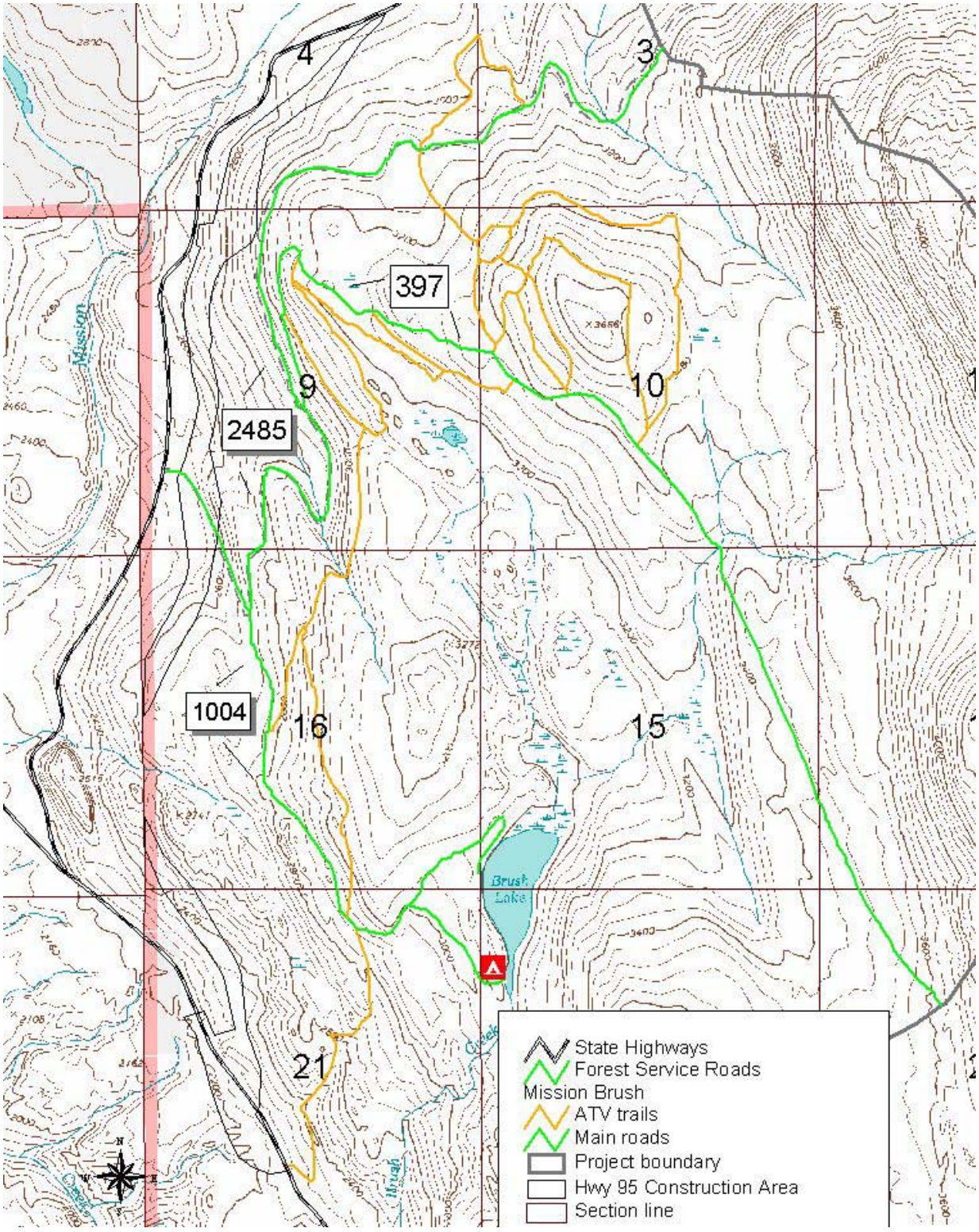


Figure 2-3. Brush Lake Area ATV Trail Network



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 2-12 through 2-14 at the end of this chapter for detailed information about these proposals.

Alternative 2 Comparison to Alternatives 3 and 4

Vegetation Treatments

Alternative 2 includes silvicultural treatments on 4036 acres
Alternative 3: 3325 acres
Alternative 4: 3073 acres

Fuel Reduction Treatments

Alternative 2 would treat fuels (logging slash) on 3900 acres;
Alternative 3: 3325 acres
Alternative 4: 2936 acres

Fuels treatments include limbing and lopping except in areas next to private property. In areas with helicopter logging systems where treetops will be removed to reduce fuels adjacent private property.

Logging Systems

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: 451 acres
- Alternative 3: 420 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 following species in the ways listed below:

Canada Lynx – Alternatives 2, 3, and 4 would continue to meet standards for lynx habitat conditions and would preserve habitat connectivity. Most of the proposed units that were located in lynx habitat are not included in Alternative 4.

Grizzly Bear – Open road densities are currently at 3.0 miles/mile^2 in the project area. Alternative 2 proposes opening about 0.55 miles of currently undriveable Road 2481H, which would temporarily raise the road density to 3.1 miles/mile^2. When all proposed post-harvest road decommissioning is completed, road densities would be reduced to 2.5 miles/mile2. Road density changes in Alternative 3 are the same as Alternative 2. Alternative 4 would not have a temporary increase because the undriveable portion of Road 2481H would not be temporarily opened; densities after post-harvest decommissioning would be the same as Alternatives 2 and 3. Timing restrictions on harvest activities would minimize potential disturbance to grizzly bears. Within the grizzly bear Deer Ridge Occupancy Area, open road density is currently 3.12 miles/mile^2; when post harvest work is finished, open road density would be reduced to 2.98 miles/mile^2 (see Chapter 4 grizzly bear discussion for more information concerning the Deer Ridge Occupancy Area.)

Flammulated Owl --Alternatives 2 and 4 would be similar in effects and would both promote long-term viability of suitable habitat. Alternative 3 would directly convert fewer acres to suitable habitat and forego treatment in several stands.

Alternatives 2, 3, and 4 would reduce wildfire risk and trend habitat toward suitable condition more quickly than no action (Alternative 1) would. There would be no decrease in acres of suitable habitat as a result of these alternatives.

Black-backed Woodpeckers -- Alternatives 2, 3, and 4 would potentially reduce the quantity of available snag habitat within harvest units. However, tree mortality would continue to persist throughout the analysis area, allowing black-backed woodpeckers to maintain populations at low endemic levels. Snag retention guidelines would assure that minimum numbers of snags in all size classes would be retained in harvest units.

Northern Goshawk – Alternative 2 would trend approximately 1,352 acres toward suitable nesting condition through selective harvest, while decreasing suitable habitat by approximately 142 acres. Alternative 3 would selectively harvest approximately 1,070 acres of capable nesting habitat, while reducing currently suitable habitat by approximately 97 acres. Alternative 4 would reduce suitable habitat by 83 acres, while trending 1,310 acres toward the desired condition.

Fisher – Alternative 2 would have the greatest impact on suitable fisher habitat, and Alternative 4 would have the least. All action alternatives would temporarily reduce fisher habitat at the local scale. However, elsewhere in the project area fisher habitat is maturing at a faster rate than it is being lost. Within treatment areas, snag retention guidelines, riparian buffers, and Lynx Conservation Assessment and Strategy standards will provide adequate amounts of suitable habitat.

Pileated Woodpecker -- All alternatives would favor retention of desired tree species and trend stands toward older size classes and promote larger snags. Alternative 2 would trend more acres toward suitable habitat than the other alternatives, and in the long-term encourage persistence and sustainability of large snag habitat. Design features would maintain minimum numbers of snags within the harvest units, and reduction in fuel loads should provide suitable habitat for a longer duration.

White-tailed Deer -- All alternatives would reduce critical midwinter range by approximately 45 acres, but would also result in improved forage quantity and quality on traditional winter range. Alternative 2 would regenerate more habitat than Alternative 4. Alternative 3 would lead to less forage habitat than Alternatives 2 and 4, but otherwise would have similar effects.

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.

Recreation – The proposals for Developed Recreation facilities, Dispersed Recreation and Trails are the same for all action alternatives. See pages 2-14 through 2-16.

Silvicultural Treatments

Several silvicultural treatment methods will be used to meet the Purpose and Need for this project. The following descriptions 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 prescriptions 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 in the future. Periodic underburning every 5 to 10 years as appropriate will be used to maintain the numerous old growth stand attributes such as open understory, create wildlife snags and keep the overall fuel loading at levels similar to those in the HRV.

Regeneration harvesting will use the **irregular shelterwood** and **seed tree with reserve tree** methods.

Underburning will have multiple roles in beginning the restoration of historic 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 2-4. Alternative 2

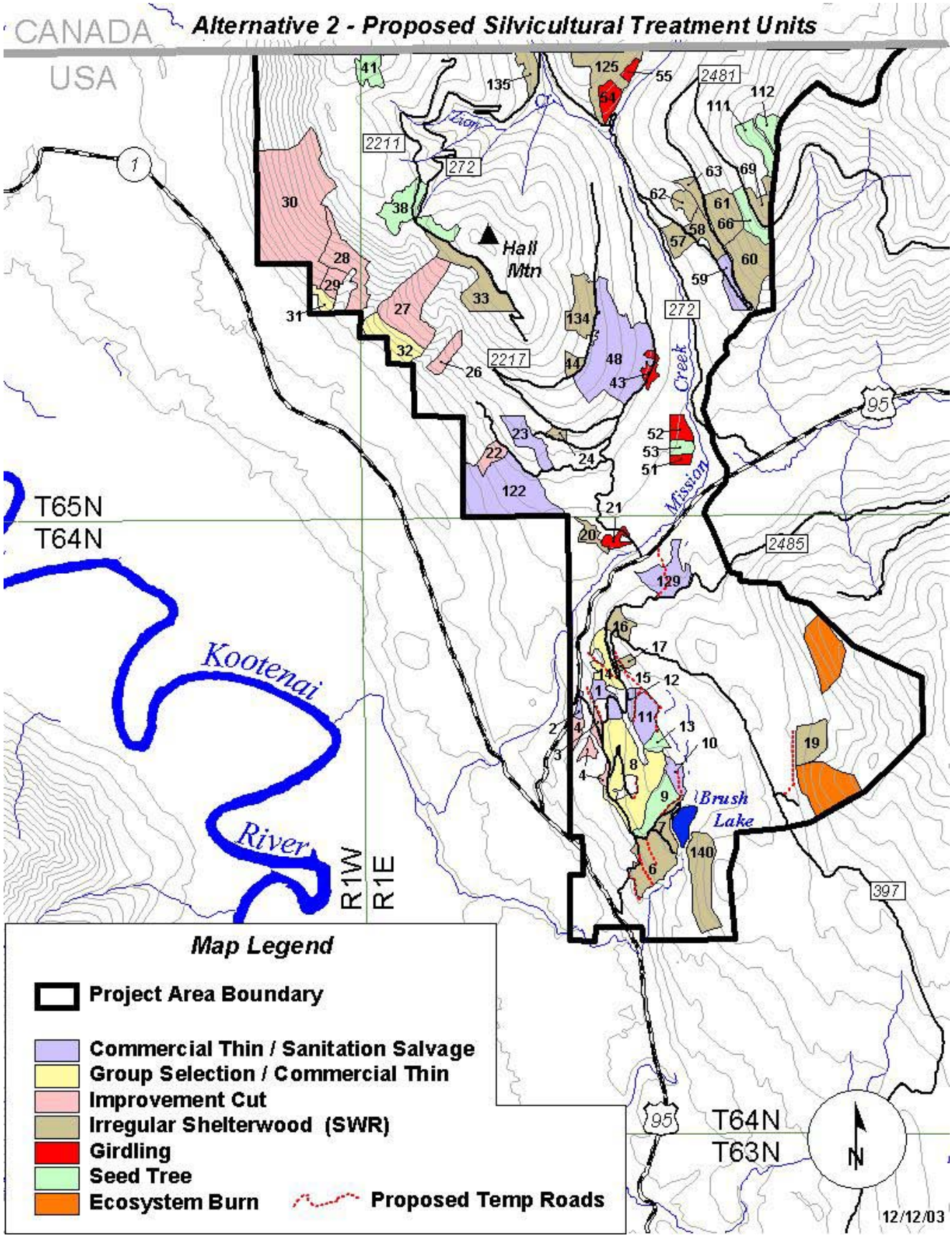


Table 2-6 Alternative 2 Restoration Treatments

Unit	Acres	Rx	Logging System	Fuels Treatment	PCC Before Treatment	PCC After Treatment
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
62	30	ISW	S	GP/UB	80	30
63	27	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	**4277**					

*Units 6, 7 - 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, 62, 63, 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 release of this document will initiate 60–day public comment period specifically related to the proposed openings. 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).

Table 2-7 Alternative 2 – Silvicultural Treatment Summary

Unit	Acres	General Stand Conditions	Description of Treatment
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 (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 regenerate the areas of the stand that are most outside the HRV. 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	Acres	General Stand Conditions	Description of Treatment
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 five to fifteen years as appropriate.
Treatment – Irregular Shelterwood Cut (ISW)			
6 7 15 16 17 19 20 24 33 44 57 58 60 61 62 63 69 125 134 135 140	114 34 6 34 9 67 26 12 125 20 39 48 133 87 30 27 46 123 86 39 128 **Total** **1232**	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.

Unit	Acres	General Stand Conditions	Description of Treatment
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.

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
- That roads are sources of sediment, which 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. (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 37 treatment areas, totaling 3325 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 37 units totaling 3325 acres.
- Ecosystem burns to improve wildlife habitat would not be conducted

See Tables 2-12 through 2-14 at the end of this chapter for detailed information about these proposals.

Alternative 3 Comparison to Alternatives 2 and 4

Road Management – 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.

Vegetation Treatments – About 618 acres in 20 treatment areas are not included in Alternative 3.
All acreages shown are approximate.
Alternative 3 treats 3325 acres,
Alternative 2 treats 4036 acres,
Alternative 4 treats 3073 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.

Fuel Reduction Treatments – All acreages shown are approximate.
Alternative 3 would treat fuels on 3325 acres
Alternative 2 treats 3900 acres
Alternative 4 treats 2936 acres.

Fuels treatments include limbing and lopping except in areas next to private property where fuels buildup is a concern. In areas with Helicopter logging systems, treetops will be removed to reduce fuels near the private land.

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 420 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 – In general, the alternatives are expected to affect the following species in the ways listed below:

Canada Lynx – Alternatives 2, 3, and 4 would continue to meet standards for lynx habitat conditions and would preserve habitat connectivity. Most of the proposed units that were located in lynx habitat are not included in Alternative 4.

Grizzly Bear – Open road densities are currently at 3.0 miles/mile2 in the bear use area. Alternative 3 proposes opening about 0.55 miles of currently undriveable Road 2481H, which would temporarily raise the road density to 3.1 miles/mile2. When all proposed post-harvest road decommissioning is completed, road densities would be reduced to 2.5 miles/mile2. Timing restrictions on harvest activities would minimize potential disturbance to grizzly bears. Road density changes in Alternative 3 are the same as Alternative 2. Alternative 4 would not have a

temporary increase because the undriveable portion of Road 2481H would not be temporarily opened; densities after post-harvest decommissioning would be the same as Alternatives 2 and 3. Timing restrictions on harvest activities would minimize potential disturbance to grizzly bears. Within the grizzly bear Deer Ridge Occupancy Area, open road density is currently 3.12 miles/mile^2; when post harvest work is finished, open road density would be reduced to 2.98 miles/mile^2 (see Chapter 4 grizzly bear discussion for more information concerning the Deer Ridge Occupancy Area.)

Flammulated Owl --Alternatives 2 and 4 would be similar in effects and would both promote long-term viability of suitable habitat. Alternative 3 would directly convert fewer acres to suitable habitat and forego treatment in several stands.
Alternatives 2, 3, and 4 would reduce wildfire risk and trend habitat toward suitable condition more quickly than no action (Alternative 1) would. There would be no decrease in acres of suitable habitat as a result of these alternatives.

Black-backed Woodpeckers -- Alternatives 2, 3, and 4 would potentially reduce the quantity of available snag habitat within harvest units. However, tree mortality would continue to persist throughout the analysis area, allowing black-backed woodpeckers to maintain populations at low endemic levels. Snag retention guidelines would assure that minimum numbers of snags in all size classes would be retained in harvest units.

Northern Goshawk – Alternative 2 would trend approximately 1,352 acres toward suitable nesting condition through selective harvest, while decreasing suitable habitat by approximately 142 acres. Alternative 3 would selectively harvest approximately 1,070 acres of capable nesting habitat, while reducing currently suitable habitat by approximately 97 acres. Alternative 4 would reduce suitable habitat by 83 acres, while trending 1,310 acres toward the desired condition.

Fisher – Alternative 2 would have the greatest impact on suitable fisher habitat, and Alternative 4 would have the least. All action alternatives would temporarily reduce fisher habitat at the local scale. However, elsewhere in the project area fisher habitat is maturing at a faster rate than it is being lost. Within treatment areas, snag retention guidelines, riparian buffers, and Lynx Conservation Assessment and Strategy standards will provide adequate amounts of suitable habitat.

Pileated Woodpecker -- All alternatives would favor retention of desired tree species and trend stands toward older size classes and promote larger snags. Alternative 2 would trend more acres toward suitable habitat than the other alternatives, and in the long-term encourage persistence and sustainability of large snag habitat. Design features would maintain minimum numbers of snags within the harvest units, and reduction in fuel loads should provide suitable habitat for a longer duration.

White-tailed Deer -- All alternatives would reduce critical midwinter range by approximately 45 acres, but would also result in improved forage quantity and quality on traditional winter range. Alternative 2 would regenerate more habitat than Alternative 4. Alternative 3 would lead to less forage habitat than Alternatives 2 and 4, but otherwise would have similar effects.

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.

Recreation – The same as Alternative 2. See pages 2-14 thru 2-16.

Figure 2-5. Alternative 3

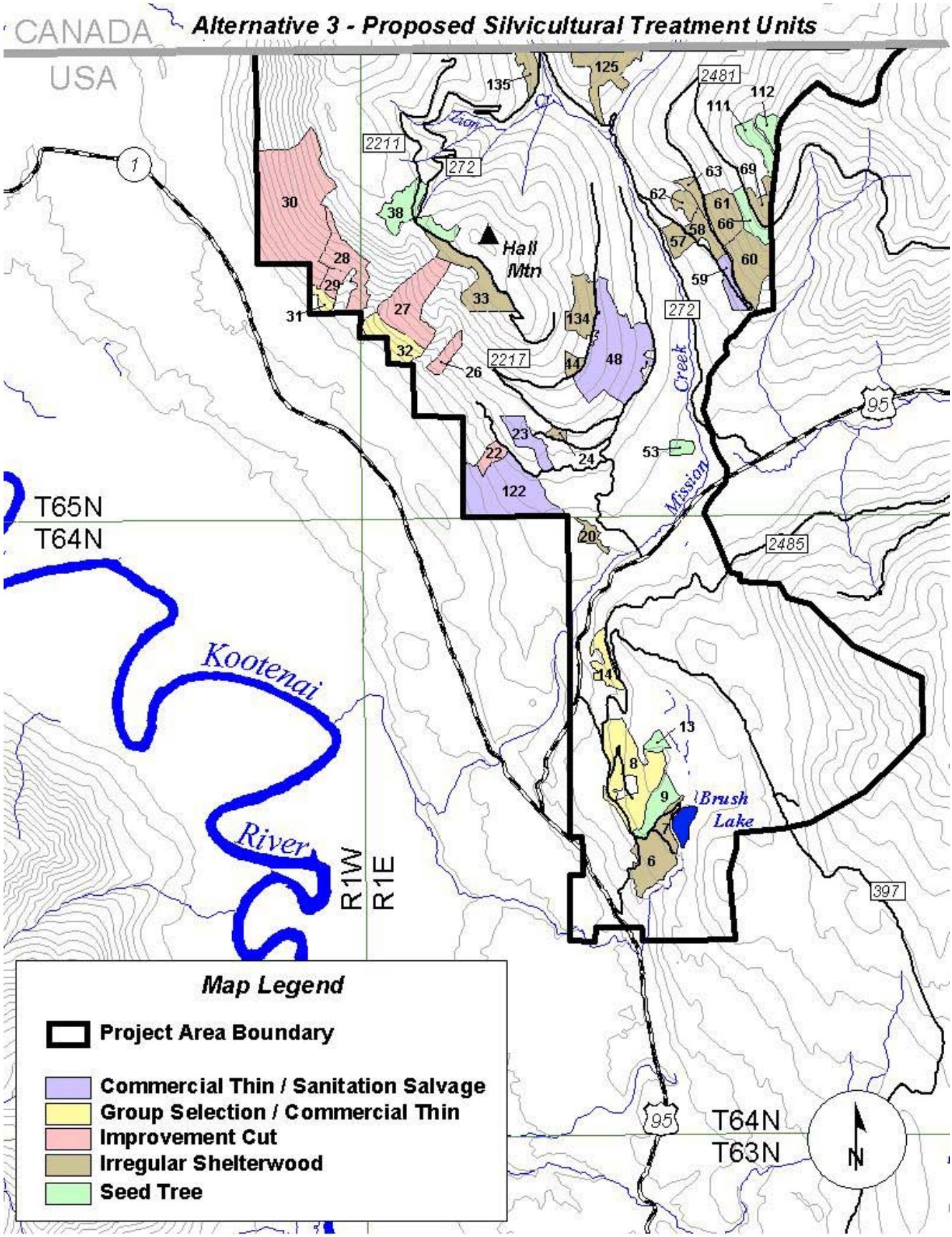


Table 2-8 Alternative 3 Restoration Treatments

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
62	30	ISW	S	GP/UB	80	30
63	27	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	**3325**					

*Units 6, 7- 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, 62, 63, 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 release of this document will initiate a 60-day public comment period specifically related to the proposed openings. 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 2-9 Silvicultural Treatment Summary – Alternative 3

Unit	Acres	General Stand Conditions	Description of Treatment
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 regenerate the areas of the stand that are furthest from the HRV. 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)			
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 five to fifteen years as appropriate.
Treatment – Irregular Shelterwood Cut ISW)			
6 7 20 24 33 44 57 58 60 61 62 63 69 125 134 135	114 34 64 12 125 20 39 48 133 87 30 27 46 123 86 39 **Total** **988**	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.

Unit	Acres	General Stand Conditions	Description of Treatment
		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.

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 would benefit Flammulated Owl, Northern Goshawk, and Pileated Woodpecker. 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 also result in less benefit to Forest Land birds, than would be expected under Alternatives 2 and 3.

Water quality, fisheries, 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. (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.
- 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.

See Tables 2-12 through 2-14 at the end of this chapter for detailed information about these proposals.

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

Proposed storage and decommissioning of 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 3073 acres
Alternative 2: about 4036 acres
Alternative 3: about 3325 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 are beneficial to some wildlife species; however, at the same time they are less beneficial or negatively impact other species.

Fuel Reduction Treatments

Alternative 4 would treat fuels on about 2936acres;
Alternative 2 treats about 3943 acres
Alternative 3 treats about 3330 acres.
Fuels treatments include limbing and lopping except in areas next to private property. In areas with helicopter logging systems, treetops will be removed with the last log 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 -- In general the alternatives are expected to affect the following species in the ways listed below:

Canada Lynx – Most of the proposed units that were located in lynx habitat have not been included in Alternative 4. Lynx habitat conditions would continue to meet the standards set forth in the LCAS in all alternatives. Habitat connectivity corridors would be preserved in the three action alternatives.

Grizzly Bear – Open road densities are currently at 3.0 miles/mile2 in the bear use area. When all proposed post-harvest road decommissioning is completed, road densities would be reduced to 2.5 miles/mile2. Alternative 4 would not have a temporary increase because the undriveable portion of Road 2481H would not be temporarily opened; densities after post-harvest decommissioning

would be the same as Alternatives 2 and 3. Timing restrictions on harvest activities would minimize potential disturbance to grizzly bears. Within the grizzly bear Deer Ridge Occupancy Area, open road density is currently 3.12 miles/mile^2; when post harvest work is finished, open road density would be reduced to 2.98 miles/mile^2 (see Chapter 4 grizzly bear discussion for more information concerning the Deer Ridge Occupancy Area.)

Flammulated Owl --Alternatives 2 and 4 would be similar in effects and would both promote long-term viability of suitable habitat. Alternative 3 would directly convert fewer acres to suitable habitat and forego treatment in several stands. All action alternatives would reduce wildfire risk and trend habitat toward suitable condition more quickly than no action would. There would be no decrease in acres of suitable habitat as a result of these alternatives.

Black-backed Woodpeckers -- All action alternatives would potentially reduce the quantity of available snag habitat within harvest units. However, tree mortality would continue to persist throughout the analysis area, allowing black-backed woodpeckers to maintain populations at low endemic levels. Snag retention guidelines would assure that minimum numbers of snags in all size classes would be retained in harvest units.

Northern Goshawk – Alternative 2 would trend approximately 1,352 acres toward suitable nesting condition through selective harvest, while decreasing suitable habitat by approximately 142 acres. Alternative 3 would selectively harvest approximately 1,070 acres of capable nesting habitat, while reducing currently suitable habitat by approximately 97 acres. Alternative 4 would reduce suitable habitat by 83 acres, while trending 1,310 acres toward the desired condition.

Fisher – Between alternatives, Alternative 2 would have the greatest impact on suitable fisher habitat, and Alternative 4 would have the least. All action alternatives would temporarily reduce fisher habitat at the local scale. However, elsewhere in the project area fisher habitat is maturing at a faster rate than it is being lost. Within treatment areas, snag retention guidelines, riparian buffers, and LCAS standards will provide adequate amounts of suitable habitat.

Pileated Woodpecker -- All alternatives would favor retention of desired tree species and trend stands toward older size classes and promote larger snags. Alternative 2 would trend more acres toward suitable habitat than the other alternatives, and in the long-term encourage persistence and sustainability of large snag habitat. Design features would maintain minimum numbers of snags within the harvest units, and reduction in fuel loads should provide suitable habitat for a longer duration.

White-tailed Deer -- All alternatives would reduce critical midwinter range by approximately 45 acres, but would also result in improved forage quantity and quality on traditional winter range. Alternative 4 would regenerate less habitat than Alternative 2. Alternative 3 would lead to less forage habitat than Alternatives 2 and 4, but otherwise would have similar effects.

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.

Recreation – The same as Alternative 2. See pages 2-14 through 2-16.

Figure 2-6. Alternative 4

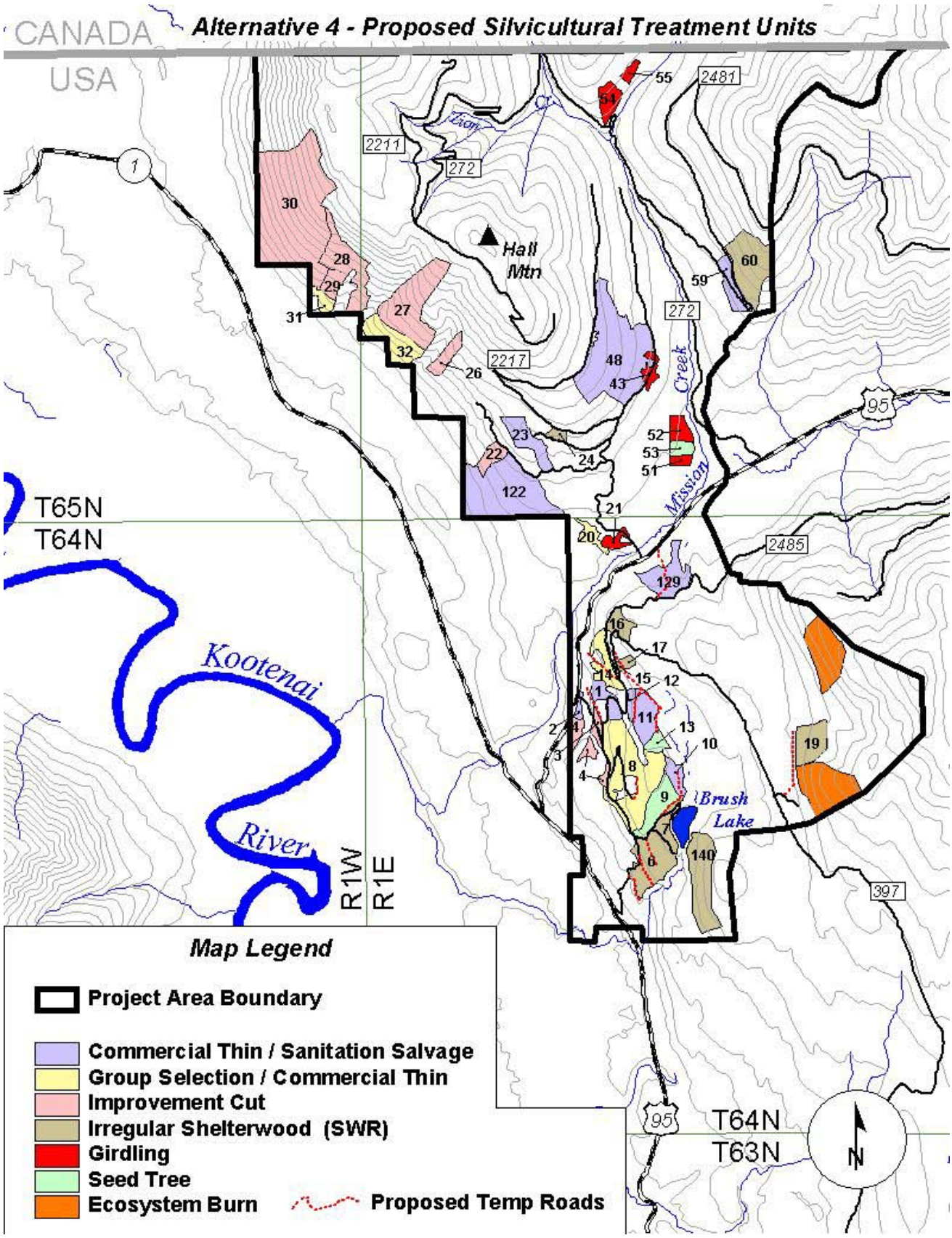


Table 2-10 Alternative 4 Restoration Treatments

Unit	Acres	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	110	UB	N/A	N/A	20	10
Ecosystem Burn	128	UB	N/A	N/A	20	10
Total	**3073**					

The proposed openings that will exceed 40 acres (Units 6, 7, 9, 19, 33, 38, 41, 57, 58, 60, 61, 62, 63, 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 release of this document will initiate 60–day public comment period specifically related to the proposed openings. 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 2-11 Silvicultural Treatment Summary – Alternative 4

Unit	Acres	General Stand Conditions	Description of Treatment
Treatment – Commercial Thin & Sanitation Salvage (CT/SS)			
1 2 10 11 12 23 48 59 122 29	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 regenerate the areas of the stand that are furthest from the HRV. 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-	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 five to fifteen years as appropriate.
Treatment – Irregular Shelterwood Cut ISW)			
6 7 15 16 17 19 24 60 140	114 34 6 4 9 67 12 133 128 **Total 536**	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 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.

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.

2.6 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. Items included through standard timber sale contract clauses.

Additional information on these criteria is included in the project file and is available by request.

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)

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.

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).

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.

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.

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.

Public Health and Safety Features:

a) 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.

b) 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.

Noxious Weed Measures

a) 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.

b) 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.

c) 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.

d) 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.

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

f) 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 -- 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).

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.

Soils

a) To reduce soil compaction and displacement and to protect residual crop trees, designated skid trails would be required for all ground-based and cable yarding operations (Froehlich, Aulerich, and Curtis, 1981).

b) 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 per Region-1 soil standards.

c) All proposed units except Unit 16 meet Region-1 soil standards. Unit 16 exceeds the standards because some of the old skid trails are too close and some rutting has occurred. The timber sale contract would have the purchaser rehabilitate the skid trails / rutting and should, thereby, move toward a net improvement in soil quality. Funding to rehabilitate those skid trails outside Unit 16 would come from KV or other sources.

d) As mitigation to prevent impact to the soil resource, proposed Units 57 and 62 would be treated in the winter and the equipment would operate on snow, or frozen ground, or a slash mat. Alternatively, a skyline system could be used during any season because of its projected low to immeasurable impacts to the soil resource.

e) All skid trail and landing locations would be approved by the Forest Service prior to harvesting and would be rehabilitated as necessary to assure that normal drainage patterns are maintained, and that exposed soil surfaces are seeded and revegetated. This would minimize the potential for sediment production and delivery.

f) Following completion of skidding and yarding operations in an area, the purchaser will seed and fertilize all exposed areas of raw soil on skid trails, landings, firebreaks, slides, slumps, temporary roads and travelways of National Forest System roads scheduled for closure by the purchaser after operations. All seed purchased shall be certified free of noxious weeds.

g) Unit design and location would facilitate logging with a minimum amount of excavated skid trails. Where excavated trails are constructed, they would be kept to a minimum and would be obliterated by the purchaser following completion of logging activities. Debris would be placed on top of the obliterated prism.

h) 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 (a through h) result in less impact to the soils in managed areas.

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

B. Criteria not included in timber sale and road construction contracts.

Noxious Weeds

a) 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.
b) 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).

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.

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 black snakeroot (Sanicula marilandica), 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 Thin Skin (USDA 1997).

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.

Soils

A variety of slash disposal methods would be utilized (underburning, grapple piling, and lop and scatter.) To provide for soil nutrients enough slash would be left, in various sizes, to meet coarse woody debris guidelines established by Graham et al (1994) for each given habitat type. 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.

Broadcast burning would be conducted only when soil moistures exceed 25%.

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.

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 avoid levels of detrimental impacts that would exceed Region 1 standards).

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 on the previous page (2-41).

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.

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.

Features Designed to Protect Watershed and Fisheries

Features Common to Alternatives 2, and 4

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.

Features Designed to Reduce Effects From Temporary Roads

Road Design - 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).

Features Designed to Reduce Sediment

Temporary and Classified Road Decommissioning to Improve Aquatic Habitat – 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).

Features Related to Timing of Activities

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.

Features Designed to Protect Soil, Water and Fish Habitat

a. 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 A. Research has evaluated the effectiveness of BMPs (Seyedbagheri 1996, USDA Forest Service Monitoring Reports 1995 - 2000). These practices would be implemented since they are requirements tied to the timber sale contract (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.

b. 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).

c. 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.

d. 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.

e. 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.)

f. 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.

Features Designed to Protect Wildlife Habitat

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, two slash piles per acre 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.

Vegetation Screen – Vegetation buffers would be left along open roads and next to treatment areas where there is a realistic chance of protecting buffers from logging and fuel treatments. This measure is designed to provide security screening for wildlife and minimize unauthorized access. Buffers would transition from a no-cut zone into the treatment prescription.

Estimated Effectiveness: Moderate to High; using specific silvicultural prescriptions and marking guides, this feature would have a high likelihood of being implemented to achieve desired objectives where creating buffers is feasible. Screens below the road would probably lack some continuity due to openings needed for landings and/or skyline corridors.

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.

Features Designed to Protect Recreation

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 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.

2.7 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.

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:

a) Tracking the status of regeneration on harvested lands to determine if restocking is completed within five years.
b) Surveying to determine insect and disease levels and potential for major outbreaks.
c) Accumulating and maintaining data on timberland suitability changes recommended by project level planning.
d) 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:

a) modification of and adjustment to contracts;
b) administrative procedures; and
c) 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 - There were originally three fisheries monitoring items when the Forest Plan was adopted. Later, two of these were combined.

Greater than 80% of potential fry emergence success: This item was monitored during 1988 and 1989. The findings were that it was not a good monitoring tool to use to report on the health of streams. The decision was made to combine this monitoring item with the one that follows on validation of fish habitat trends.

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.

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.

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 Monitoring
In addition to Forest Plan monitoring, monitoring is conducted on specific projects to ensure that implementation is consistent with the established standards and guidelines. Monitoring is also conducted to determine the effectiveness of management activities and applied mitigation measures.

Project Implementation 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.

1) 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.

2) 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.

3) 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.

4) 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.

5) 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.

Project Effectiveness Monitoring

1. 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.)

2. 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.

3. 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).

4. 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.

5. 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.

6. 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.

7. 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.

2.8 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.

2.9 Comparison of Alternatives: No Action (Alternative 1), Proposed Action (Alternative 2) and Alternatives 3 and 4

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

Table 2-12 Summary and Comparison of Vegetation and Fuels Treatments

Vegetation Treatment Type	Alt 1	Alt 2	Alt 3	Alt 4
Regeneration Cuts				
Irregular Shelterwood (ISW)	0	1232	988	537
Seed tree (ST)	0	402	370	106
Total acres of Regeneration Cuts	0	1634	1358	643
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
Total Acres of Vegetation Treatments	**0**	**4036**	**3325**	**3073**
Logging Systems				
Ground Based (acres)	0	1213	855	830
Skyline (acres)	0	451	420	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	1737	1760	1315
Grapple Pile with follow-up Underburn (acres)	0	1400	1148	857
Total Acres of Fuels Treated	**0**	**3900**	**3325**	**2936**
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.

Figure 2-7. Differences in Proposed Vegetation Treatment Units, by Alternative

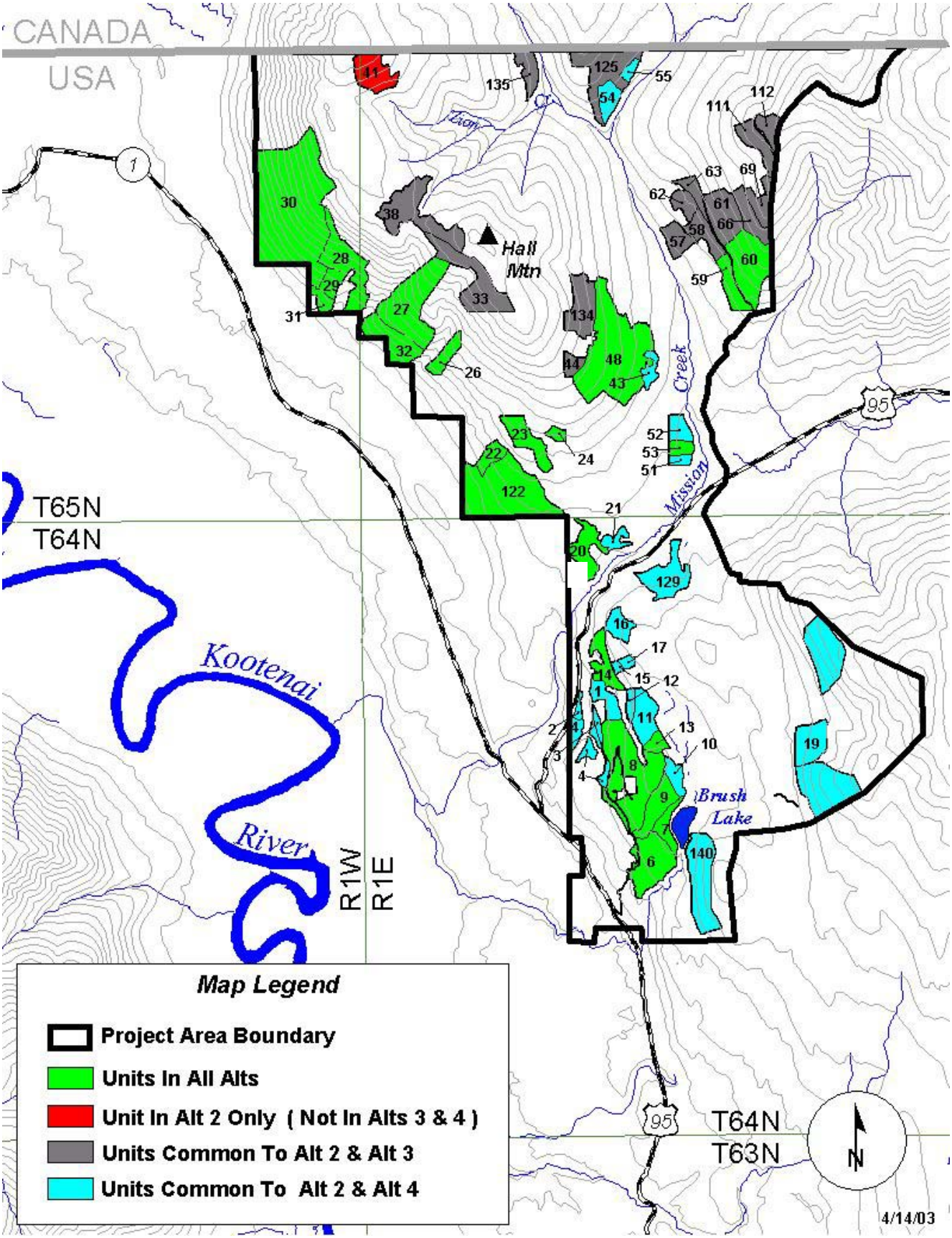


Figure 2-8. Road System in Mission Creek and Hall Mtn Areas

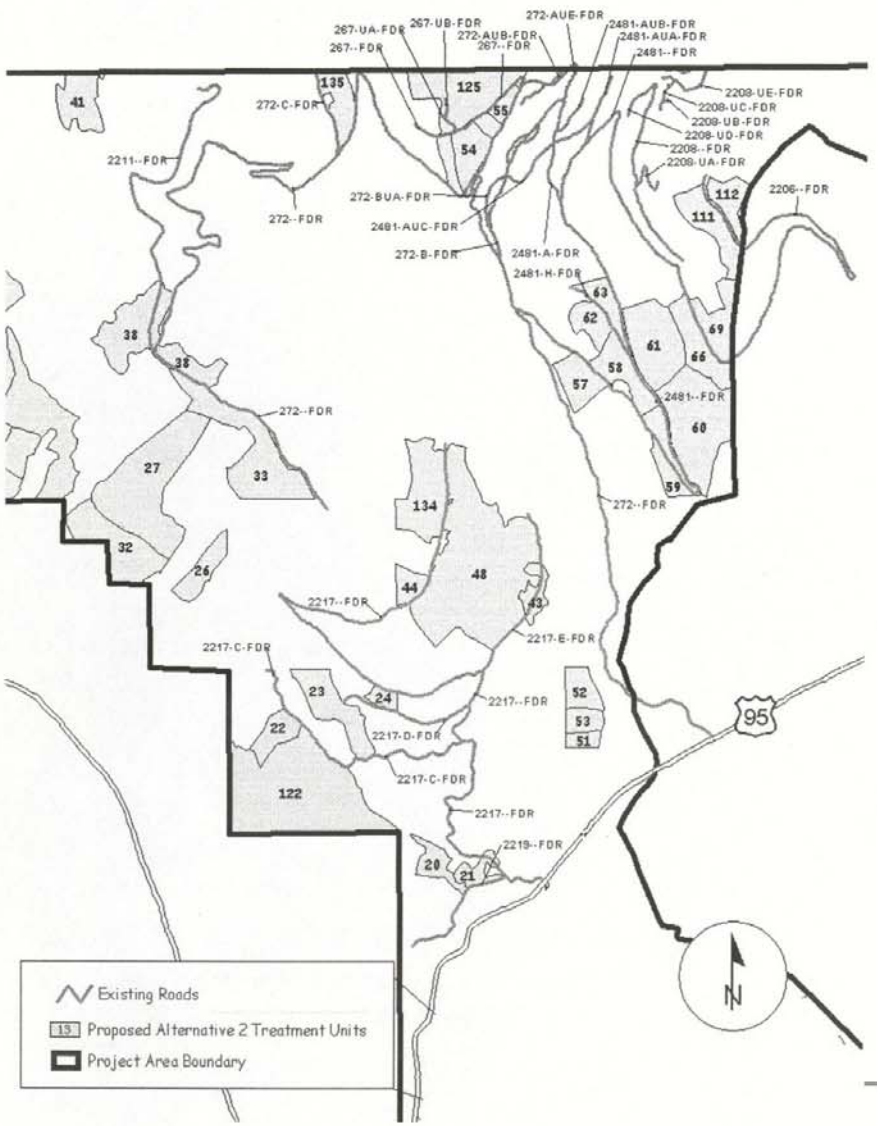


Table 2-13 Proposed Road Treatments Mission Creek and Hall Mtn areas

Road	Alt 2	Alt 3	Alt 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 note #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 haul route
2217-C	Decommission last 1/2 mile	Decommission last 1/2 mile	Decom. last 1/2 mi
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 – Resurface first 1 mile and in area of East Fork bridge. General maintenance. Upgrade culvert near intersection with Road 2481.
#2 – Basic maintenance only, upgrade culvert near intersection with Road 2481.
#3 – Improve. Resurface approximately 0.5 miles. Upgrade culvert at MP 0.83.
#4 – Improve; resurface first switchback.
#5 – Storage. Pull culverts; recontour drainage. Install non-drivable waterbars connected to ditchline. Seed and close with a berm.

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

Figure 2-9. Road System in the Brush Creek Area

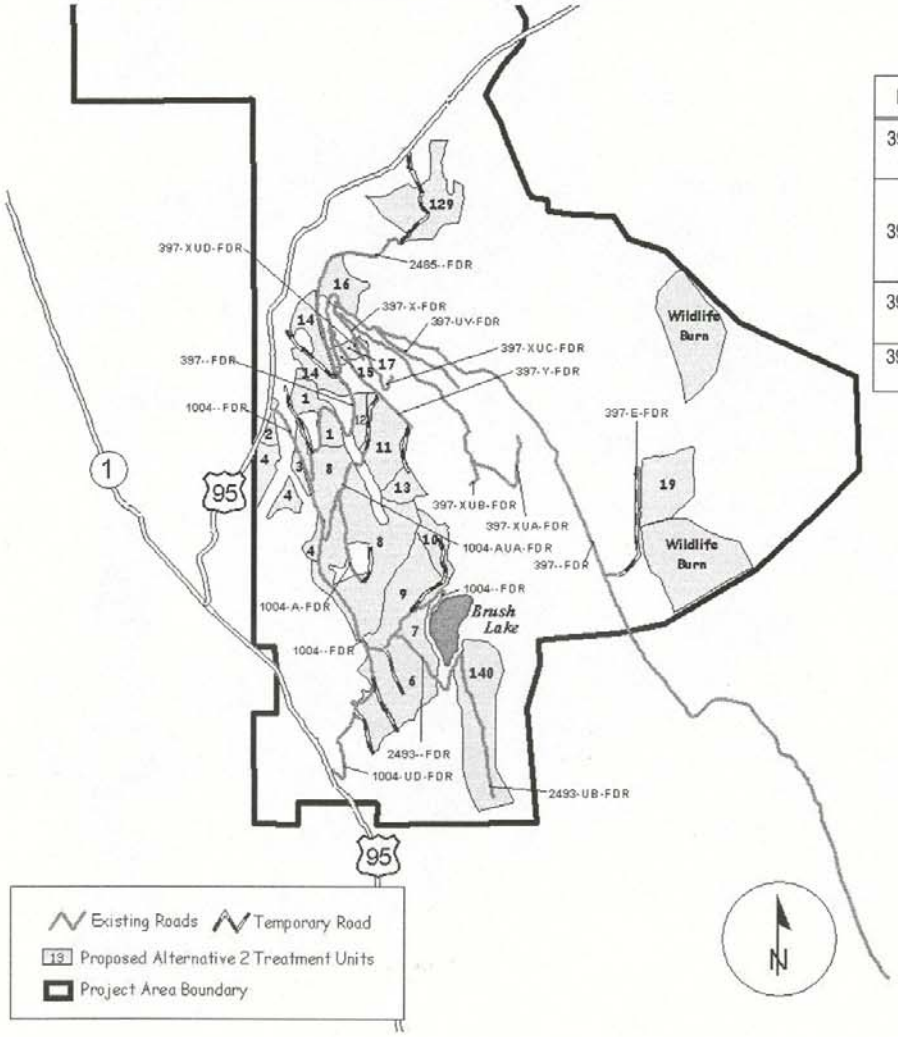


Table 2-14 Proposed Road Treatments Brush Lake Area

Road	Alt 2	Alt 3	Alt 4
397-Y	Decommission after use	Decommission after use	Decommission after use
397-E	Construct temporary road Decommission after use	--------	Construct temporary 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 map but not listed in the table (such as #397-UV-FDR) have been analyzed for future needs and opportunities. However, they are not included in any of the current alternatives.

Table 2-13 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)	1634 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)	1358 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 2-15 continued -- Comparison of Alternatives by Resource Issues

Wildlife Habitat trends

Alternative 1	Alternative 2	Alternative 3	Alternative 4
Canada lynx – long-term trend towards increased denning habitat, decrease of high-quality forage	Canada lynx – long-term trend towards decreased denning habitat, increase of high-quality forage	Canada lynx – long-term trend towards decreased denning habitat, increase of high-quality forage	Canada lynx – long-term trend towards increased denning habitat, decrease of high-quality forage
Grizzly bear – No change in open road density within project area, long-term decrease in forage	Grizzly bear – Reduced open road density, long-term increase in forage	Grizzly bear – Reduced open road density, long-term increase in forage	Grizzly bear – Reduced open road density, long-term increase in forage
Black-backed woodpecker - decrease in large snags; overall increase in snag abundance, nesting and foraging habitat	Black-backed woodpecker - increase in large snags; decrease in abundance of small snags in harvested areas	Black-backed woodpecker - increase in large snags; decrease in abundance of small snags in harvested areas	Black-backed woodpecker - increase in large snags; decrease in abundance of small snags in harvested areas
Flammulated owl - Long-term trend toward decreased suitable habitat.	Flammulated owl – Long-term trend toward increased suitable habitat.	Flammulated owl – Long-term trend toward increased suitable habitat.	Flammulated owl – Long-term trend toward increased suitable habitat.
Northern goshawk – Long-term trend toward decreased suitable habitat.	Northern goshawk – Possible short-term reduction in suitable habitat, but long-term trend toward increased suitable habitat.	Northern goshawk – Possible short-term reduction in suitable habitat, but long-term trend toward increased suitable habitat.	Northern goshawk – Possible short-term reduction in suitable habitat, but long-term trend toward increased suitable habitat.
Fisher – Potential reduction in forage, maintain denning habitat	Fisher – Potential increase in forage, reduced denning habitat	Fisher – Potential increase in forage, reduced denning habitat	Fisher – Potential increase in forage, small reduction of denning habitat
Pileated woodpecker – Long-term trend toward decreased habitat quality	Pileated woodpecker – possible short-term decline in habitat quality; long-term trend toward increased habitat quality.	Pileated woodpecker – Possible short -term decline in habitat quality; long-term trend toward increased habitat quality.	Pileated woodpecker – Possible short -term decline in habitat quality; long-term trend toward increased habitat quality.
White-tailed deer – maintain or increase critical mid-winter range, long-term loss of forage.	White-tailed deer – loss of small amount of critical mid-winter range, increased forage.	White-tailed deer – Loss of small amount of critical mid-winter range, increased forage.	White-tailed deer – Loss of small amount of critical mid-winter range, increased forage.

Table 2-15 continued -- Comparison of Alternatives by Resource Issues

Watershed and Aquatics Habitat

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
The effects of <u>harvesting and resulting canopy openings</u> 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 <u>road construction, decommissioning, and maintenance</u> 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 <u>timber harvesting on mass failure potential on the west-facing slopes of Hall Mountain</u>	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 2-15 continued -- Comparison of Alternatives by Resource Issues

Recreation Facilities and Opportunities

Issue	Alternative 1	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

This chapter describes the current condition of the resources as related to the driving issues. These issues represent components of the environment that would affect, or that could be affected by the alternatives if they were implemented. Much of the information in this chapter is tiered to 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 consists of approximately one million acres (Bonners Ferry, Sandpoint, and Priest River Ranger Districts) of the northern portion of the IPNF. Assessments of individual sub-basins (essentially ranger districts) were also conducted. For this document the Kootenai River sub-basin refers to the Bonners Ferry Ranger District (BFRD) and accounts for roughly 400,000 acres.

3.1 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.

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.

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.

a. 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.

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.

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

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 (BAER 2002).

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

B. Humans in the Mission Brush Ecosystem

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).

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.

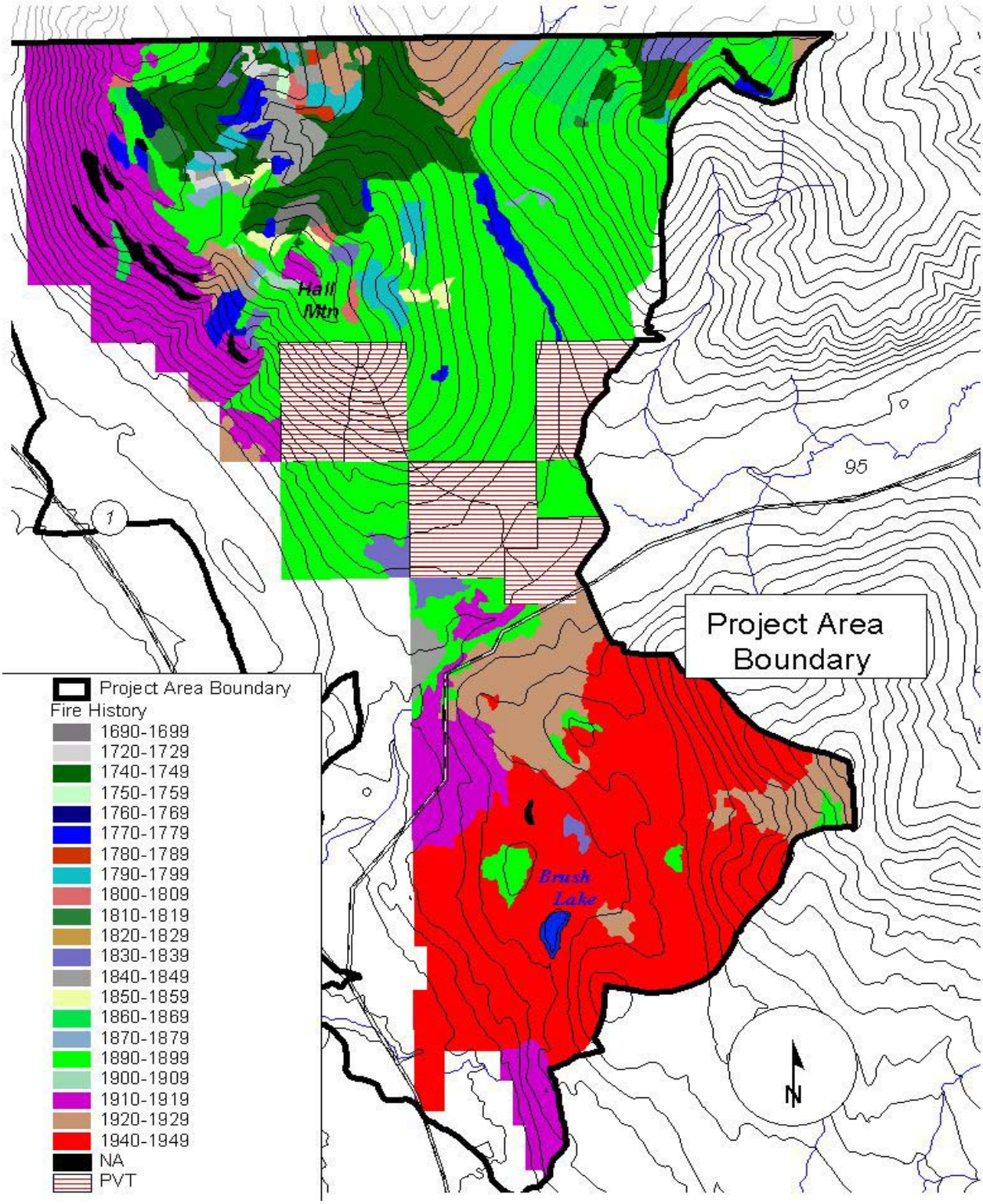
The basic tasks of building fireline and "mopping up" after a fire is controlled have not changed a great deal over time. Continuous studies of the science of fire and application of new technologies benefit land managers and incident management teams when they are establishing strategies and objectives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

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; all but one of the fires grew larger than five acres.

Figure 3-9. Mission Brush Fire History



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

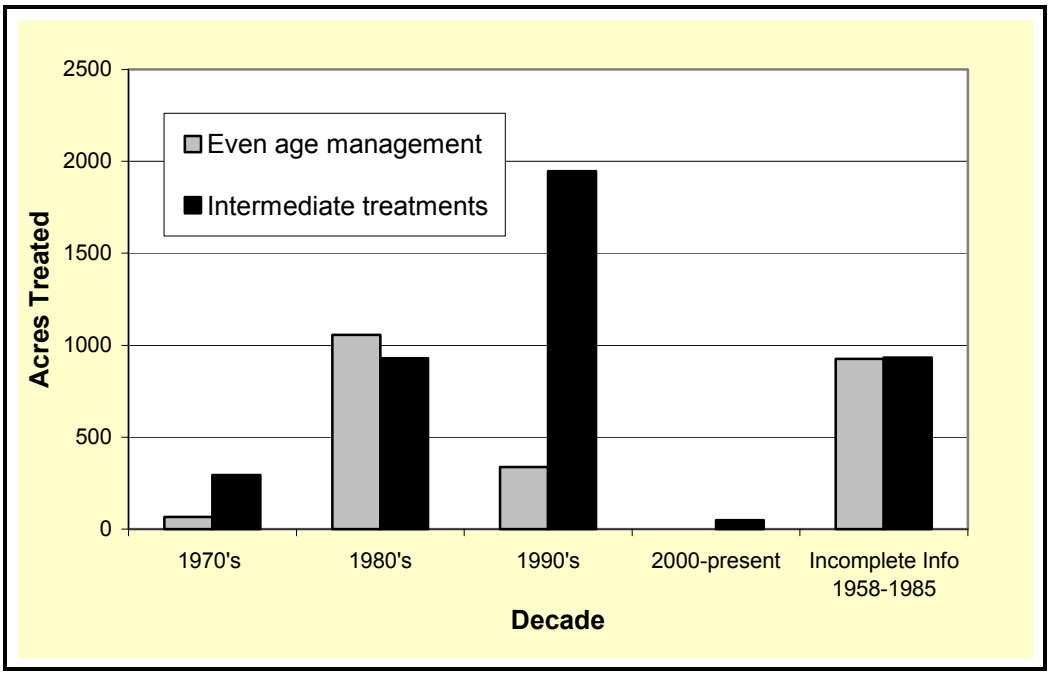


Table 3-1 illustrates the National Forest timber sales that were sold and harvested from the 1950's to present. (Information for some of the sales between 1958 and 1985 is incomplete. When the timber stand management information was converted from written records to computer-based data, some information was missing, such as name of sales and activity codes.)

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

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[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.

economic selection cutting, depending on landowner objectives. Although the sales on private land are not included in the following list, the effects of those activities are included in the existing condition and analysis of probable effects of National Forest management activities.

Table 3-1. National Forest Timber Sales within the Mission Brush Project Area

Sale Name	Year	Even-Aged	Intermediate	Uneven-Aged	TOTALS
Tungsten Mountain	1974	28			28
Mission Pine	1975		75		75
Round Prairie Hill	1977	7			7
Mission Harvey	1977-80	31	220		251
Mission 30	1980-81	133	40		173
Joker	1982		6		6
Eastport Y	1983-84	82	89		171
Harvey Mountain	1984-85	33	307		340
Prairie View	1985		8		8
Boundary Line	1985-86	6	213		219
Brush Lake	1986	65	23		88
Hall Mountain Salvage	1988		12		12
East Fork Mission 90	1988-89	95	84		179
Hall Brass Salvage	1989		110		110
Hall Mountain Pulp	1989	70			70
West Mission Gillon	1988-89	527	37		564
Mission 160	1989-90	46			46
Mission Possible	1991		287		287
Montgomery Mine	1991		40		40
96 Tiers	1992-93	278	201		479
Along Hall	1993-95	38	274		312
Helitier	1994	13	254		267
Uproaring Salvage	1996		89		89
Wiley Coyote	1996		35		35
Deer Park	1998	9	94		103
FBGB	1996-8		464		464
Flory Roundwood	1998		7		7
Olson Sawlogs	1998-99		10		10
Alonghaul Salvage	1999		90		90
Deer Park Blowdown	1999		1		1
Helirockter	1999		100		100
Rock Bottom	2001		49		49
Incomplete Information	1958-85	926	933		1,859
TOTALS		**2,387**	**4,152**	**0**	**6,539**

 # Information on these activities is incomplete. Examples of missing information include the Timber Sale Name, Timber Sale Activity Code, or other data typically included in the Timber Stand Management Record System (TSMRS).

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 decline in all tree species. There is too much competition for moisture, sunlight, and nutrients.

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:

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*).

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.

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.

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).

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).

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.

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).

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).

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).

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.

1) Broad Scale Comparisons

The following tables and figures are useful in broad scale planning when comparing habitat groups (Table 3-2 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 3-2. Existing Condition of Vegetation in the Project Area Compared to the Kootenai River sub-basin

Habitat Types	Percent of Project Area (acres)	Percent of Area (acres)
	Mission Brush Habitat Groups	Kootenai River sub-basin
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

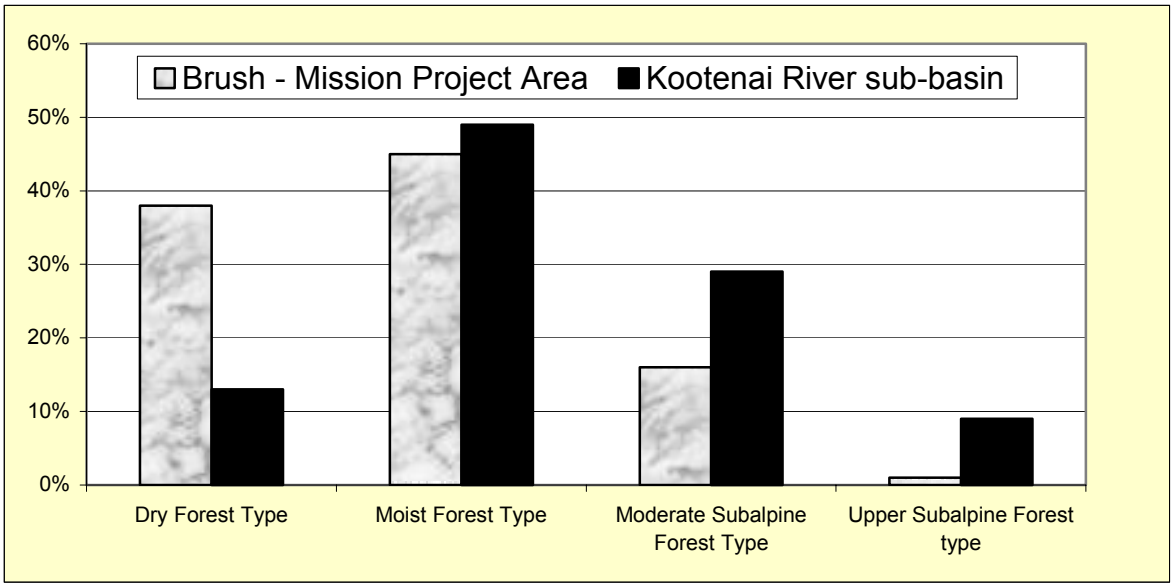


Figure 3-21. Historic vs. Current Forest Types - Mission Brush Project Area Species distribution from a historical perspective.

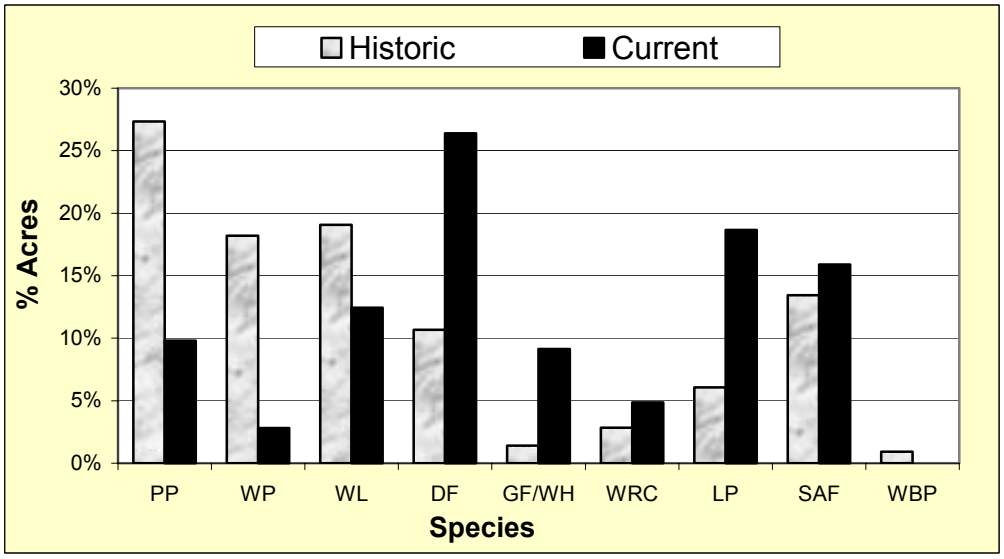
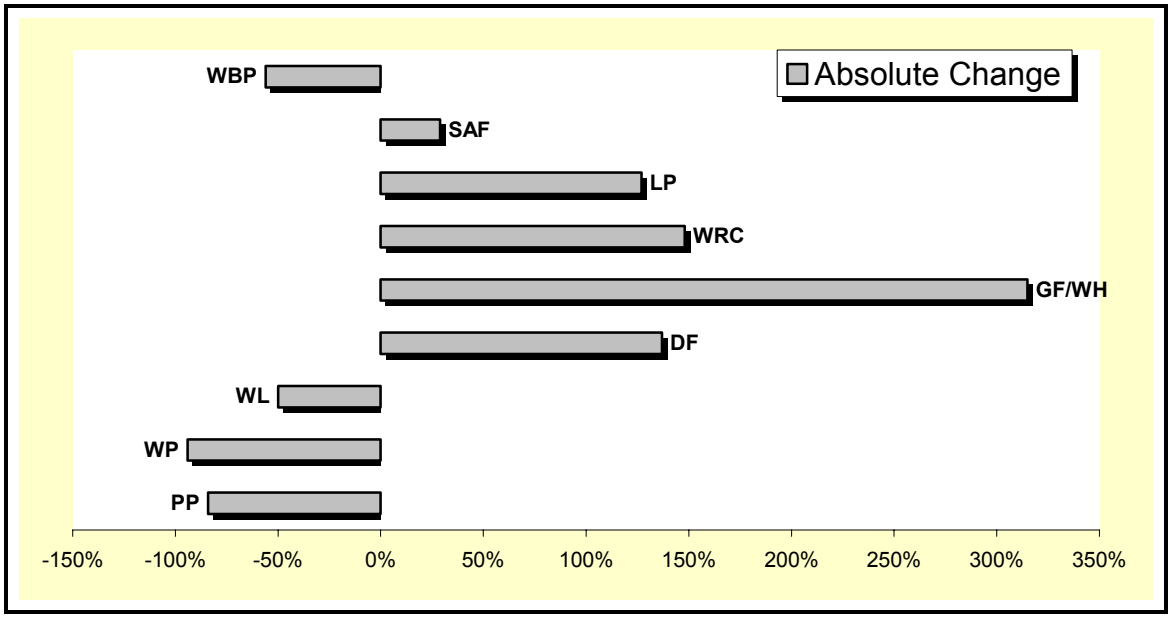


Figure 3-22. Absolute Change in Species Composition -- Kootenai River Sub-basin



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 outside the Historical Range of Variability (HRV), 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.

G. North Zone Geographic Assessment Findings

The North Zone Geographic Assessment (NZGA – Figure 3-23) defines forests in 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).

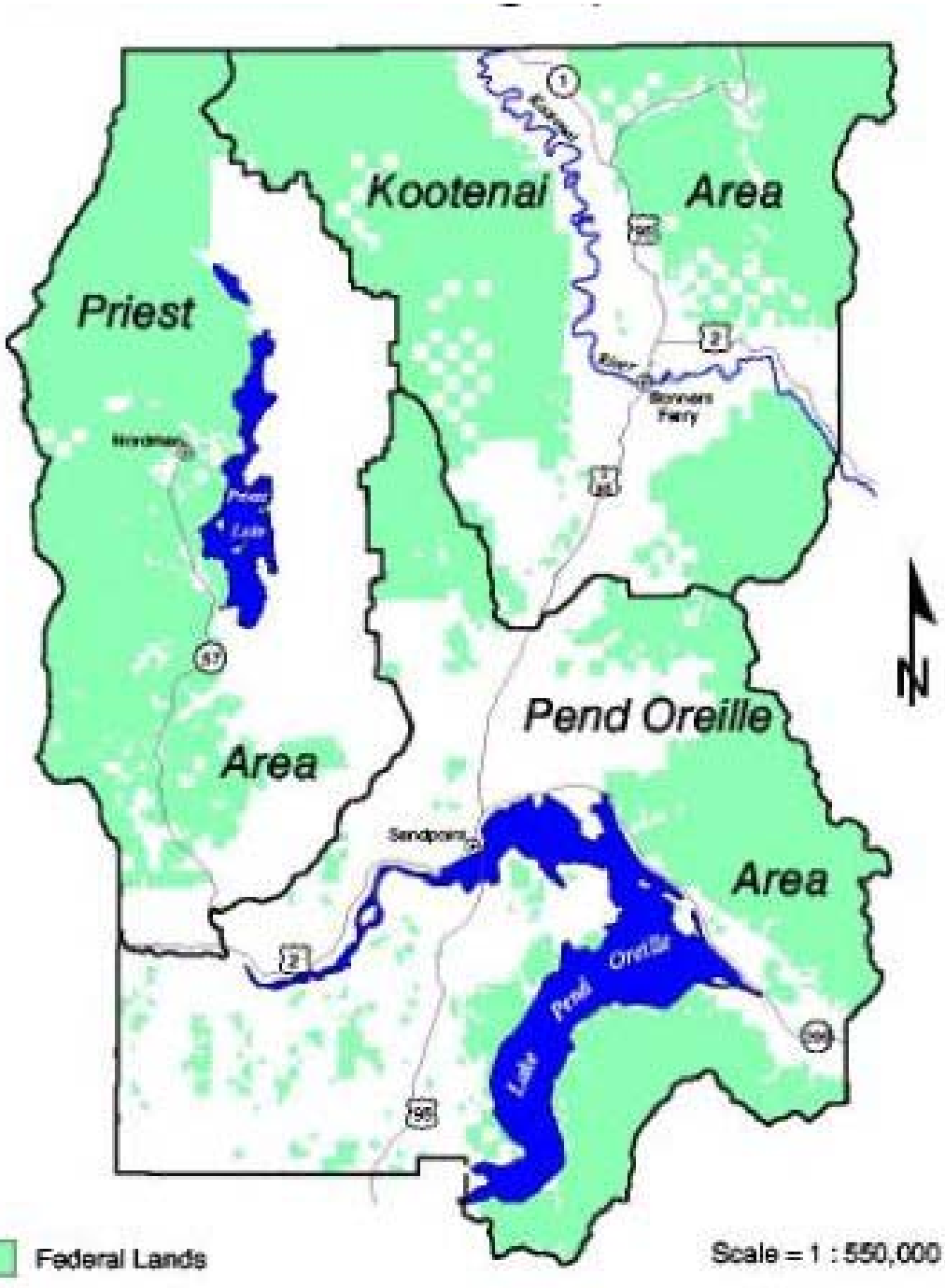
Some of these recommendations include:

- 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:

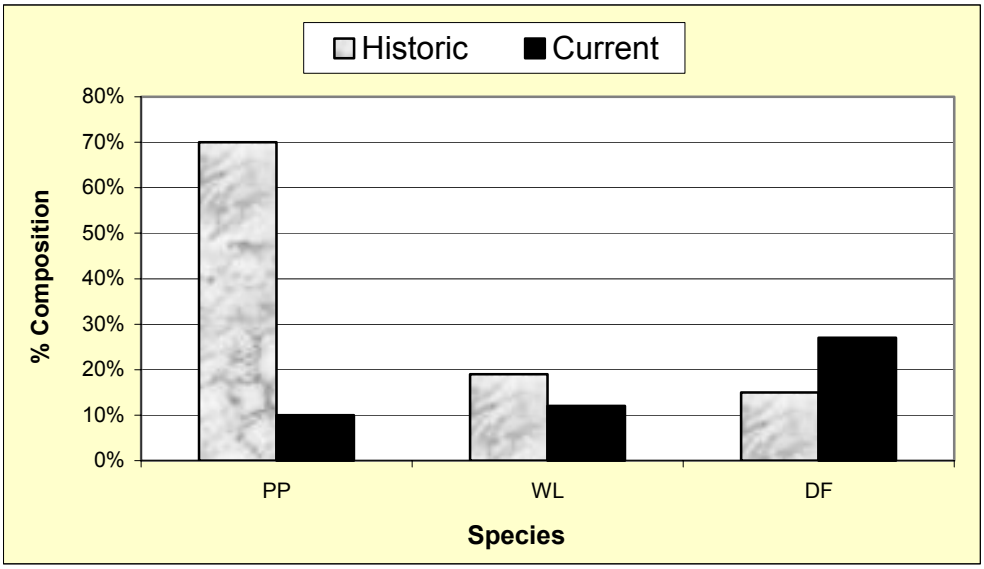
- Reduce the extent of drought and fire intolerant species (grand fir, western hemlock, and western red cedar) on sites where they are not well-adapted and likely drought stressed.
- Reduce the extent of short-lived early seral forest species (Douglas-fir and lodgepole pine) that are near the end of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

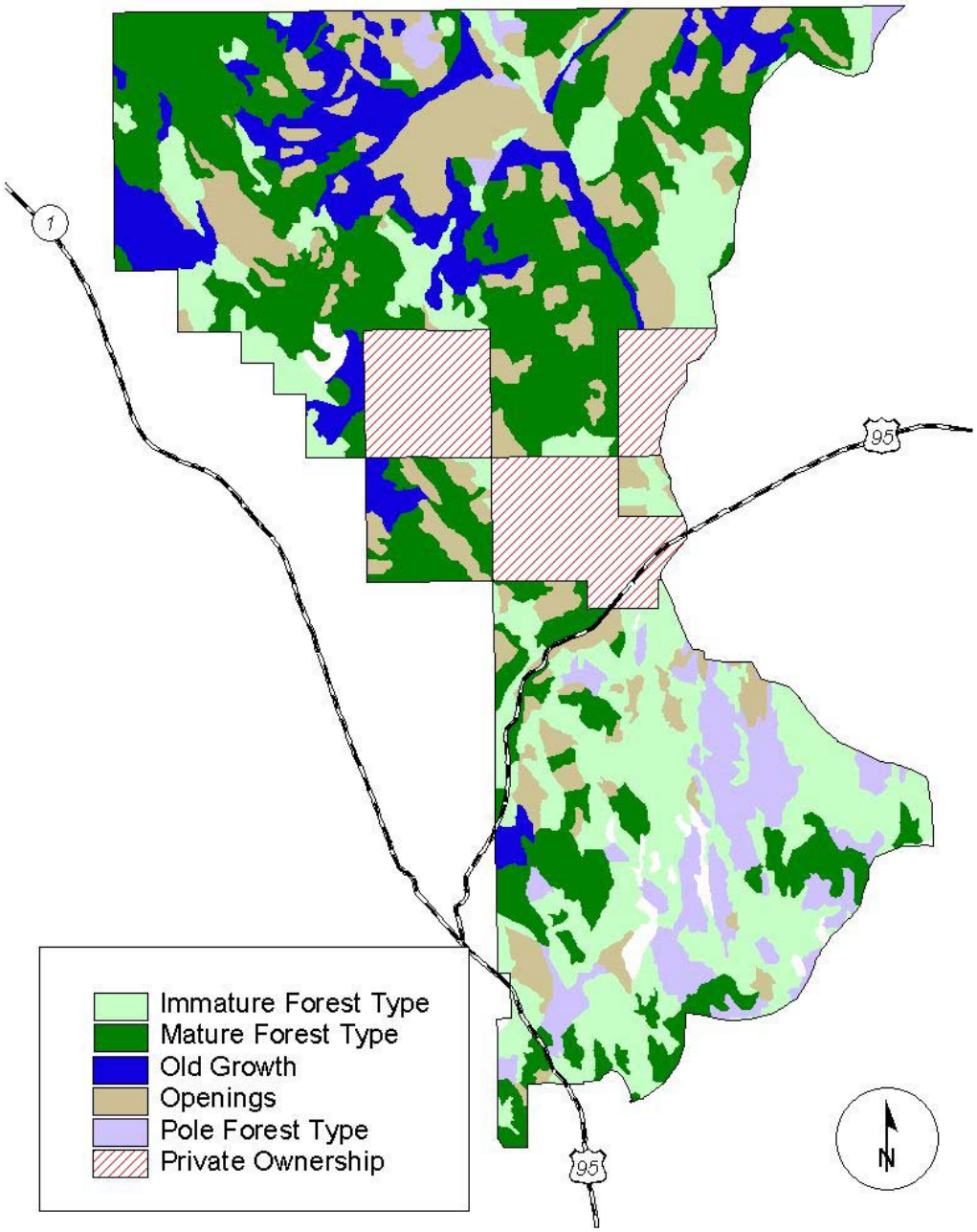
- Ponderosa pine has decreased from an estimated 70% to 10%
- Western larch has decreased from an estimated 19% to less than11%
- Douglas-fir has increased from an estimated 12% to 27%

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).

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



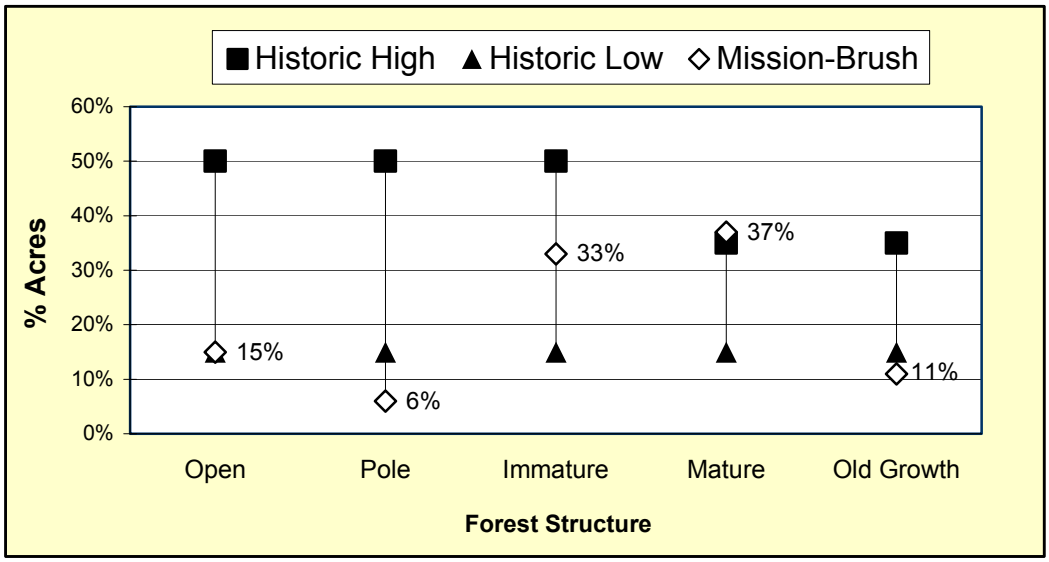
Once again, since fire has in effect been removed from the ecosystem, forest structure has been determined mostly by fire suppression and timber harvest. Figure 3-26 displays current forest structure compared to the estimated historic ranges (North Zone GA) of each structural class. Current distribution 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 (37%) fall outside historic range (15-35%), on the lower end of the range

- Old growth timber stands (11%) fall below the historic range (15-35), on the lower end of the range

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 Historical Range of Variability (HRV) for old growth on the North Zone was an 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 11% are included in the IPNFs old growth allocation. This is below the estimated HRV of 15 – 35% for the North Zone forests.

I. 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.

- 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

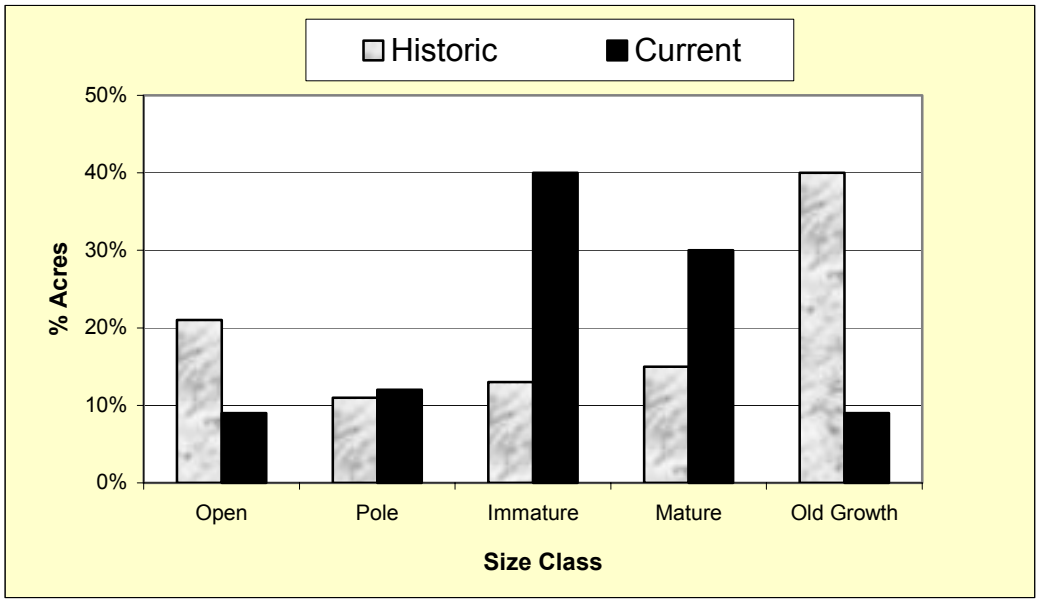
Most of the old growth in the assessment area is located on moist forest types in riparian areas where western red cedar and western hemlock are the dominant species. However, the amount of old growth in dry forest types is lower than estimated historic levels (Figure 3-27).

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 HRV. The important thing to remember is that the composition and structure of these stands is well outside the HRV, placing large areas at risk of insect and disease and stand replacement

fires. To meet Forest Plan minimum requirements, 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.

The dry-site old growth stands in the project area meet these requirements, but they are also densely stocked with small diameter Douglas-fir and grand fir, which threaten the integrity of these old growth forests.

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 immature and mature forest components (which are well outside their reference point in HRV scale and need treatment in order to trend them toward old growth status that will have a species composition and structure that are within the HRV and therefore sustainable over time.

J. 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.

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 within HRV

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.

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.

3.2 AQUATICS

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. There are no streams within the project area currently listed on the Idaho 303(d) list of water quality limited stream segments. Brush Creek and Mission Creek and its tributaries will be listed for temperature on the upcoming 2004 TMDL list (Dave Mosier, personal communication, 4/17/03). The requirements of the INFISH 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 (referenced in Appendix B and Chapter 2).

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."

B. Methodology

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 (Kootenai River) Geographic Assessment (USDA draft in progress). Additional information was gathered from district fish and hydrology files, historical records, aerial photographs, and published scientific literature.

2) The WATSED Model

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) 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).

4) 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).

C. Characterization

1) 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).

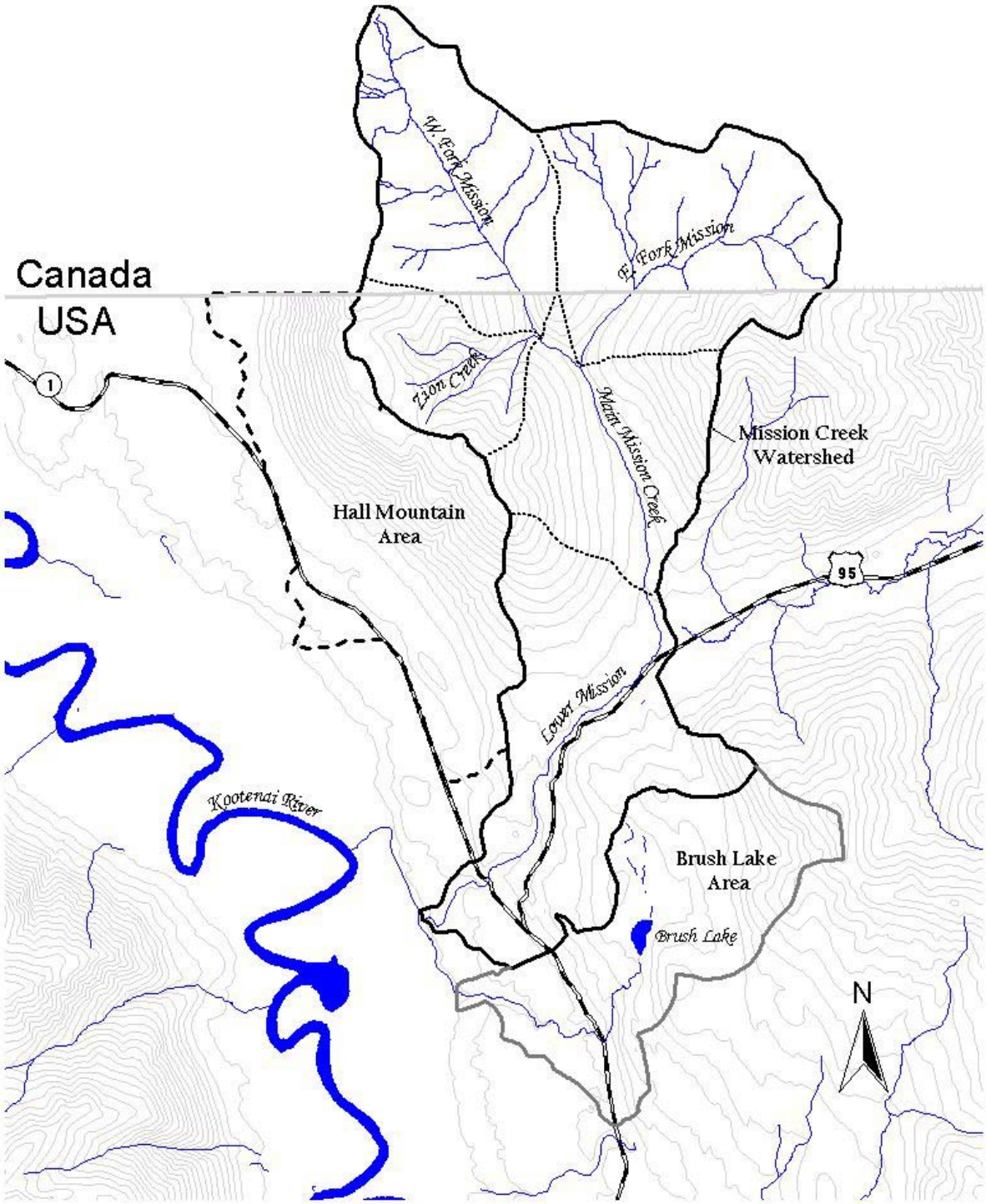
The Kootenai River Basin has experienced several glacial advances and recessions as well as tectonic forces and volcanic eruptions that have created the landtypes that exist today. Within the Hall Mountain and Brush Lake Areas and the Mission Creek watershed, the landtypes consist mostly of glaciated 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).

2) 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) 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[3]. When warm air masses associated with moisture raise the freezing level to above 4,500 feet, 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.

D. Fish Presence and Biological Requirements

1) Fish Presence

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.

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[3] An isothermal snow pack is when the entire snow pack reaches the temperature of 32 degrees farhenheit.

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).

b. 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.

c. 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).

d. Torrent Sculpin

Torrent Sculpin were added to the Idaho Panhandle' 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. 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.

f. 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.

2) 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.

E. 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.

1) 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.

a. Mission Creek Watershed

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.

b. Brush Creek

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.

2) Watershed and Erosional Processes

a. Hall Mountain Area

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.

b. Mission Creek Watershed

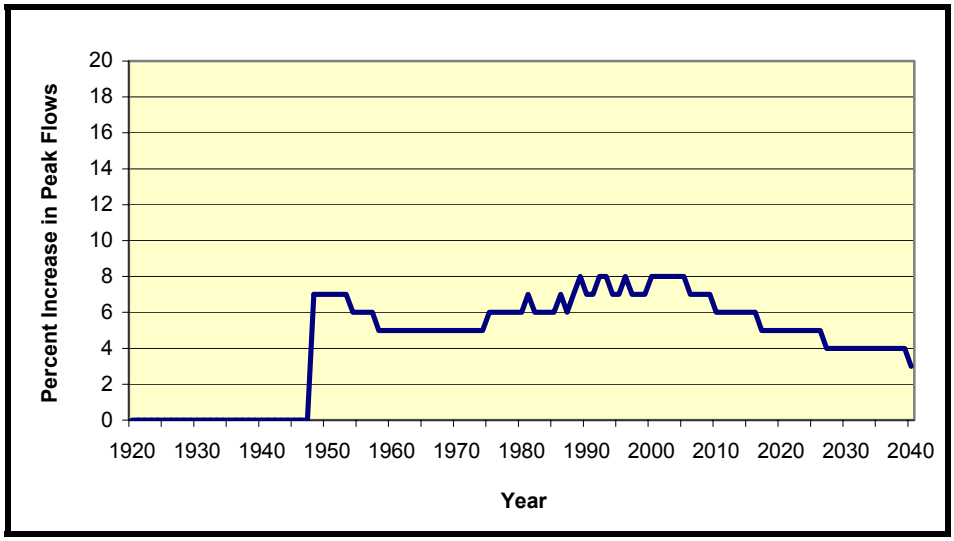
Water Yield and Peak Flows

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.

Figure 3-32 displays the estimated peak flow increases from past fires, road construction and harvest activities from 1920 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 1890's, 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 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 this 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 is 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. Figures 3-33 and 3-34 together show a strong relationship between harvest activities and road building and fluctuations in sediment yields. Figure 33 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 3-34 shows annual miles of road construction associated with past activities in the watershed. 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 3-33. Estimated acres harvested or burned in the project area since 1920 by decade, modeled with WATSED.

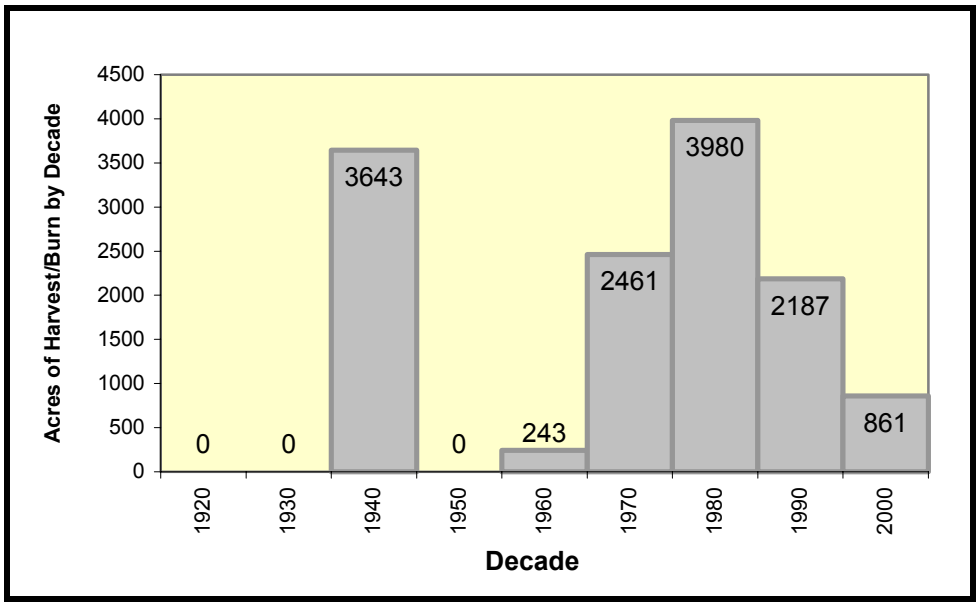
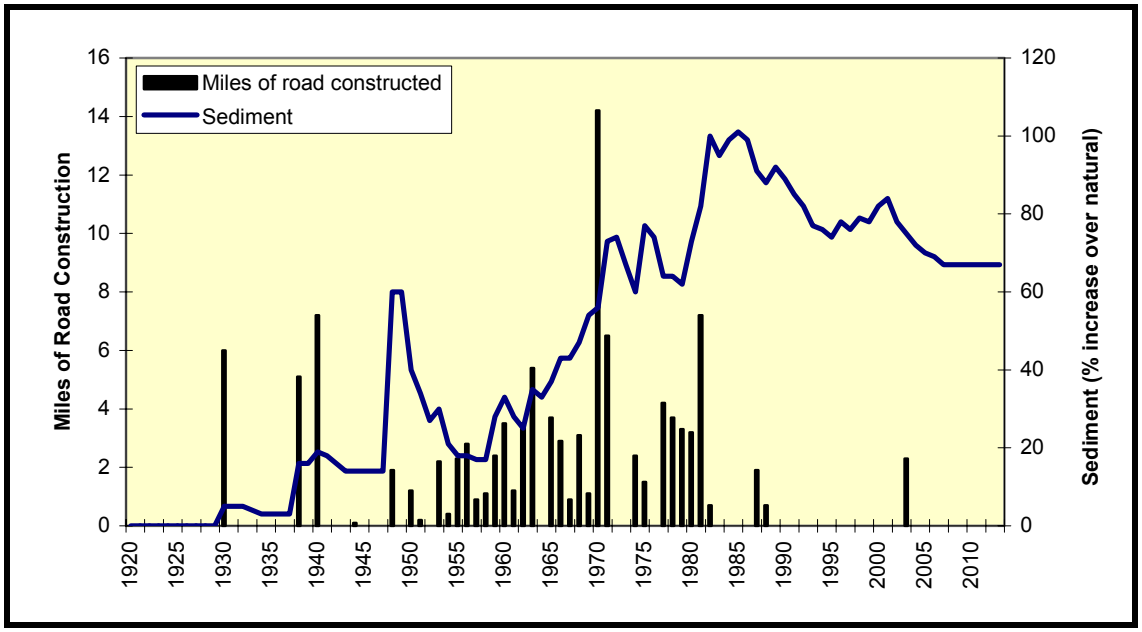


Figure 3-34. Effects of road building and sediment yield.



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 with BMPs and presumably produced less sediment. This helps explain the differences in sediment yield increases between the two time periods.

F. 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.

G. Watershed Existing Conditions

1) 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 Creek and Brush Creek are currently not meeting temperature standards for cold-water communities. This has resulted in a proposed 303d listing of both streams for temperature in 2004.

2) 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).

a. Mission Creek

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.

b. Brush Creek

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.

3) Watershed and Erosional Processes

a. Hall Mountain Area

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.

b. Mission Creek

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.

4) Fisheries - Fish Population Existing Conditions

a. 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.

b. 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.

5) Habitat

a. 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).

b. 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 (>4%) and highly confined with the predominant substrate being gravels and cobbles (Rosgen B3/B4) and short bedrock sections (Rosgen A1/B1).

6) Threatened and Endangered Species

a. White Sturgeon

White sturgeon are not found outside of the mainstem Kootenai River, which is outside of the cumulative effects area for this project.

b. 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.

7) 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).

8) Sensitive Species

a. 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.

b. 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.

c. 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.

d. Burbot

Burbot are not found outside the mainstem Kootenai River, which is outside the cumulative effects area for this project.

3.3 WILDLIFE

A. Regulatory Framework

The following regulatory directions are applicable to the management of wildlife resources:

- 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),
- Idaho Panhandle National Forests Forest Plan (USDA 1987), and
- Forest Service policy.

The US Fish and Wildlife Service (USFWS 2002) has identified five listed wildlife species that may occur on the Idaho Panhandle National Forests. The Endangered Species Act requires an evaluation of potential effects of proposed actions on listed species and a determination as to the effects of those actions. A Biological Assessment will be prepared and submitted to the USFWS for concurrence (if necessary) prior to a decision. The documentation of effects and rationale for conclusions are built into the main text of this EIS and the project file for sensitive species (USDA Forest Service 1995). A summary of the conclusion of effects for all sensitive species can be found in Appendix B.

B. Affected Environment

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 more generalists and have adapted to a wide array of vegetation patterns.

1) Characterizations 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 Chapter 4) as well as disturbance types (i.e., fire, windthrow, landslide, and insect outbreaks) 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 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 (less than 4,000 ft) 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. This 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 483 acres of allocated old growth in OGMU 19. However, fire suppression policies are causing these stands to lose the very characteristics that are recognized as 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 wildfires 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 harvesting has altered the habitat by removing with even age and uneven age management.

C. Methodology

1) Species Screen

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 (Forest Plan)
- Available Conservation Assessments and Strategies for wildlife species

Table 3-3 displays the results of this screening process for Threatened, Endangered and Sensitive species (TES), Management Indicator Species (MIS), and other wildlife of interest or special concern known to occur on the Idaho Panhandle National Forests.

Table 3-3. Management Indicator Species analyzed in the project area.

	No detailed discussion and analysis is necessary for species or habitat presumed not to be present within the affected area. The rationale for no further analysis for these species can be found in the project file.	Supporting rationale is presented in this section for those species that are presumed to be present but not necessarily affected by the proposed actions. No detailed discussion and analysis is necessary.	Species considered present and potentially affected by the proposed actions are carried forward into a detailed discussion and analysis in Environmental Consequences Section.
Threatened and Endangered Species			
Northern gray wolf (*Canis lupus*)		✓	
Woodland caribou (*Rangifer tarandus caribou*)	✓		
Bald eagle (*Haliaeetus leucocephalus*)	✓		
Canada lynx (*Lynx canadensis*)			✓

Grizzly bear (*Ursus arctos horribilis*)			✓
Sensitive Species			
Black-backed woodpecker (*Picoides arcticus*)			✓
Common loon (*Gavia immer*)		✓	
Flammulated owl (*Otus flammeolus*)			✓
Harlequin duck (*Histrionicus histrionicus*)	✓		
Northern goshawk (*Accipiter gentilis*)			✓
Peregrine falcon (*Falco peregrinus anatum*)	✓		
White-headed woodpecker (*Picoides albolarvatus*)		✓	
Fisher (*Martes pennanti*)			✓
Northern bog lemming (*Synaptomys borealis*)	✓		
Townsend's big-eared bat (*Corynorhinus townsendii*)		✓	
Wolverine (*Gulo gulo*)		✓	
Boreal toad (*Bufo boreas*)		✓	
Coeur d'Alene salamander (*Plethodon vandykei idahoensis*)		✓	
Northern leopard frog (*Rana pipiens*)		✓	
MIS and Others			
Pileated woodpecker (*Dryocopus pileatus*)			✓
American marten (*Martes americana*)		✓	
Rocky Mountain elk (*Cervus elaphus nelsoni*)		✓	
White-tailed deer (*Odocoileus virginianus*)			✓
Forest land birds			✓
Snag habitat		✓	

D. Species Habitats and Requirements

This section includes a brief discussion of the species habitat preferences and requirements based on scientific literature and information from site-specific information. It also describes the environmental baseline and relevant habitat components that may or may not be affected by the alternatives if they were implemented.

1) Species Analyzed in Detail

a. 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). Conditions that contribute to lynx habitat are 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 predators (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 in Ruggiero et al. 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.

b. 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.

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 are 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, personal commmunication).

The portion of the project within the bear use area is approximately 7,352 acres (11.49 mi2). There are approximately 34.98 miles of open roads in this area, creating an open road density of 3.04 miles/mile2. 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.

c. Black-backed woodpeckers

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 100 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.

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. However, 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 (less than 12 inches) are relatively abundant in the Brush Lake area.

d. 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. Accordingly, species associated with this community, such as the white-headed woodpecker and the flammulated owl, have declined in abundance.

While no population numbers exist for the historic presence of flammulated owls, inferences can be made when comparing the historical occurrence of ponderosa pine with current levels. Based on historic vegetation estimates, 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 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 most older ponderosa pine forests by younger forests with a greater proportion of Douglas-fir. Therefore, one can conclude that flammulated owls were probably more abundant in the past than they are today.

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 have allowed the natural advance of vegetation change through time, causing a decline in habitat conditions for flammulated owls. Forest stands that were mostly dominated by low densities of ponderosa pine and Douglas-fir trees, have given 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. There were no confirmed flammulated owl vocalizations noted on any of these surveys. 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. No flammulated owl vocalizations have been recorded on any of these surveys. The west face of Hall Mountain, which potentially has the best current flammulated owl habitat in the project area, was also surveyed in 2003.

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 (less than 30 feet) 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 364 acres of

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. Most of the capable flammulated owl habitat is concentrated on the south and west faces of Hall Mountain, and in the Brush Lake area.

e. Northern Goshawk

The northern goshawk 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. 1991). 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 (Haward and Escano 1989, Squires and Reynolds 1997, Graham and others 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 minimum 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 by either 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. One of the nests (Mission Creek) has been inactive for several years, while the other site (Hall Mountain) represents a recently established territory. Since these two sites are only separated by approximately 1.5 miles, it is possible that they signify alternate nest stands of the same territory.

The Mission-Brush area contains 10,899 acres of capable goshawk habitat, 1,357 acres of which are modeled as currently suitable for nesting. There are 12 contiguous nesting stands of more than 30 acres within the project area, but distribution is not uniform within capable habitat. Most nesting stands are concentrated in the Mission Creek area; suitable habitat patches in the Brush Lake area are generally smaller and further apart. Both documented nest sites within the project area are in habitat modeled as suitable.

f. 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. However,

most local biologists believe that fishers were previously extirpated from the area and that 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 of 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 9,270 acres of capable fisher habitat are present within the project area, 2,296 acres of which are currently suitable.

g. 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- to 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 times (less than 35 years), 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. Even so, due to the more mesic nature of these stands, much of this area is unlikely to be utilized by pileated woodpeckers.

Within the project area, there are 9,287 acres of capable pileated woodpecker nesting habitat, 2,995 of which is currently suitable. Most of the capable acres are in the Brush Lake area, the rest spread between Hall Mountain and drier habitats east of Mission Creek. About half of the capable acres in the Hall Mountain area are currently suitable, while less than ¼ of the capable acres in the Brush Lake area are currently suitable.

h. 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 ed.1999). Severity of winter appears to be the most limiting factor (Compton ed.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 ed.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 U.S. Highway 95 in the lower Mission Creek drainage.

i. 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. These principles are: 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.

j. Snag Habitat

Snags, or standing dead trees, are vital components of the forest ecosystem. In the Interior Columbia River basin, they provide habitat for more than 80 species of birds, mammals, reptiles, and amphibians and play a critical function in long-term site productivity (Bull et al. 1997). Many forest-dwelling animals use these structures for nesting, foraging, denning and roosting.

Most notable users of this habitat are primary excavators, such as hairy woodpeckers and Northern flickers, which create cavities in decaying wood of standing trees. These cavities are subsequently used by other wildlife species once the primary excavators have abandoned them (Bull et al. 1997). Fallen snags or dead and down woody material have important ecological functions including nutrient cycling, nitrogen fixation, and wildlife habitat
.
Historically, ecosystems in north Idaho were shaped by disturbance patterns that altered the size and distribution of forest structure across the landscape. Forest succession, wind damage, fire, insects and disease created snags in areas that ranged in size from individual trees or small patches, to entire drainages. Consequently, snag densities vary across the landscape, from areas with low densities to other areas with high densities.

Snag habitat associated with the Mission Brush project area has been strongly influenced by fire and the subsequent changes in vegetation composition. The severe fires of the 1800s left much of the landscape in early stages of forest development. A large lethal and mixed-severity fire in the 1850s probably left a lot of snags across the landscape. This change in condition likely increased, temporarily, the breeding densities of black-backed woodpeckers.

Although this stand-replacing fire provided a pulse of hard snags, it disrupted the continuity and sustainability of snag production that would occur during the predicted sequence of vegetation change. Because most snags generally do not persist long after a catastrophic fire, black-backed woodpecker populations probably dispersed from the burn areas within several years following the fire. Morrison and Raphael (1993) found that snags created by fire fell sooner than non-fire-created snags. Burning at their base probably weakens snags created by fire. Also, snags in large burned areas are directly exposed to wind, causing them to fall sooner than snags surrounded by live trees. In addition, subsequent large-scale fires likely consumed most of the remaining snags on the landscape.

Design features of the project were devised to ensure the retention and selection of snags at a level and distribution to support viable populations of species that use snags and logs. Snags and snag

replacements would be retained in all treatment units at levels recommended by the Region 1 Snag Management Guidelines. The Snag Guidelines recognize that not all stands are able to meet snag guidelines, but that the overall goal is to provide adequate snag habitat over the landscape. Snag retention objectives exceed Forest Plans standards and snag retention levels developed by Thomas et al. (1979).

Potential effects to snag habitat will be addressed in detail in analysis of effects upon snag-dependent species (black-backed woodpecker, pileated woodpecker, flammulated owl, northern goshawk and fisher).

3.4 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.

A. 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 (Coeur d'Alene north) 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.

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.

a. 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.

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 exceptional in its expense.

Access roads into both recreation sites are in poor condition, pot-holed, narrow, and without appropriate turnouts. Signing from the highway is inadequate.

Existing vault toilets in the campground and the day use area are in very poor condition. Neither toilet is universally accessible.

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

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.

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.

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.

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.

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.

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.

Despite the inadequacies and safety concerns, Brush Lake has ardent and outspoken local support with a general concern to retain its rustic nature.

b. 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.

c. 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.

d. Trail Use

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.

2) 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

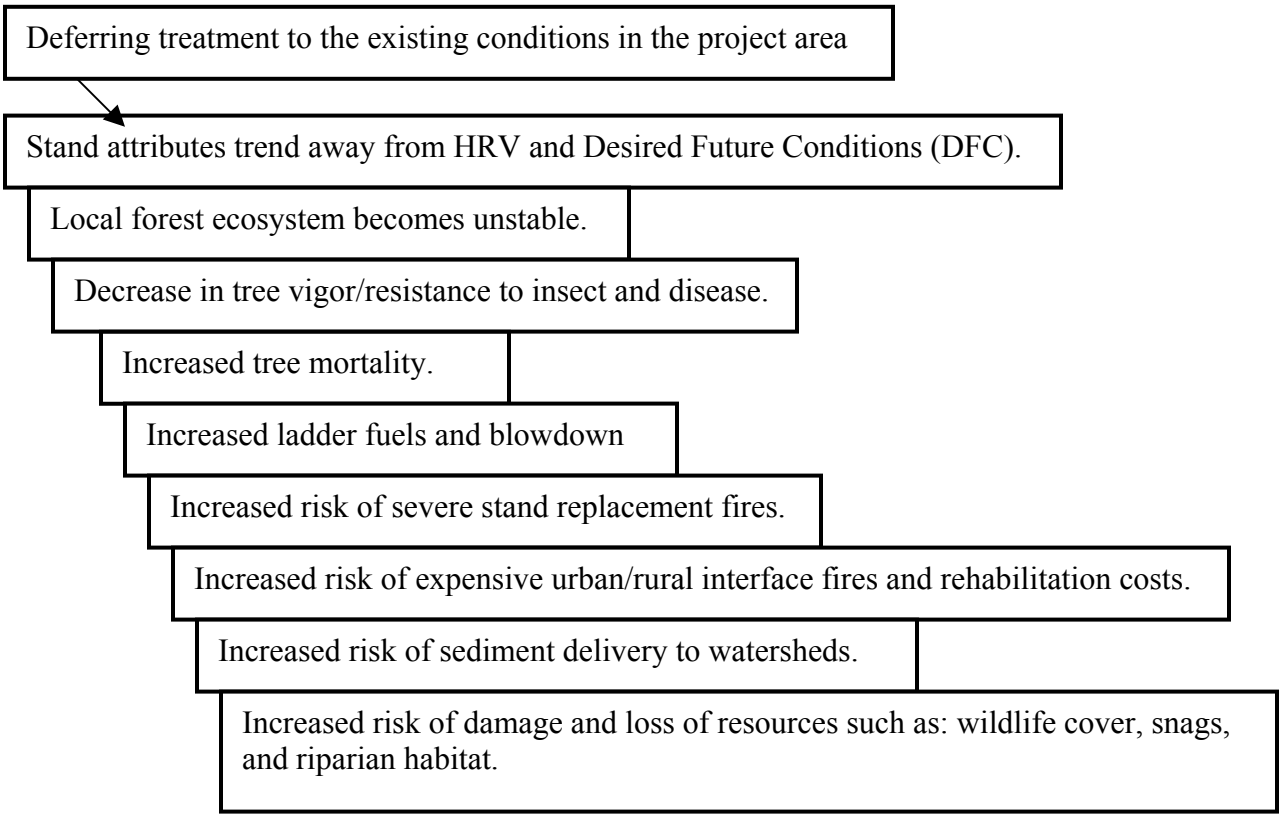
This chapter describes the probable environmental consequences the alternatives described in Chapter 2; including associated post harvest work such as sale area improvement activities and slash disposal. Chapter 4 forms the scientific and analytical basis for the comparison of alternatives. Impacts to 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.

4.1 FOREST VEGETATION

A. Forest Composition

1) Alternative 1 - No Action

Figure 4-1. General Flowchart



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).

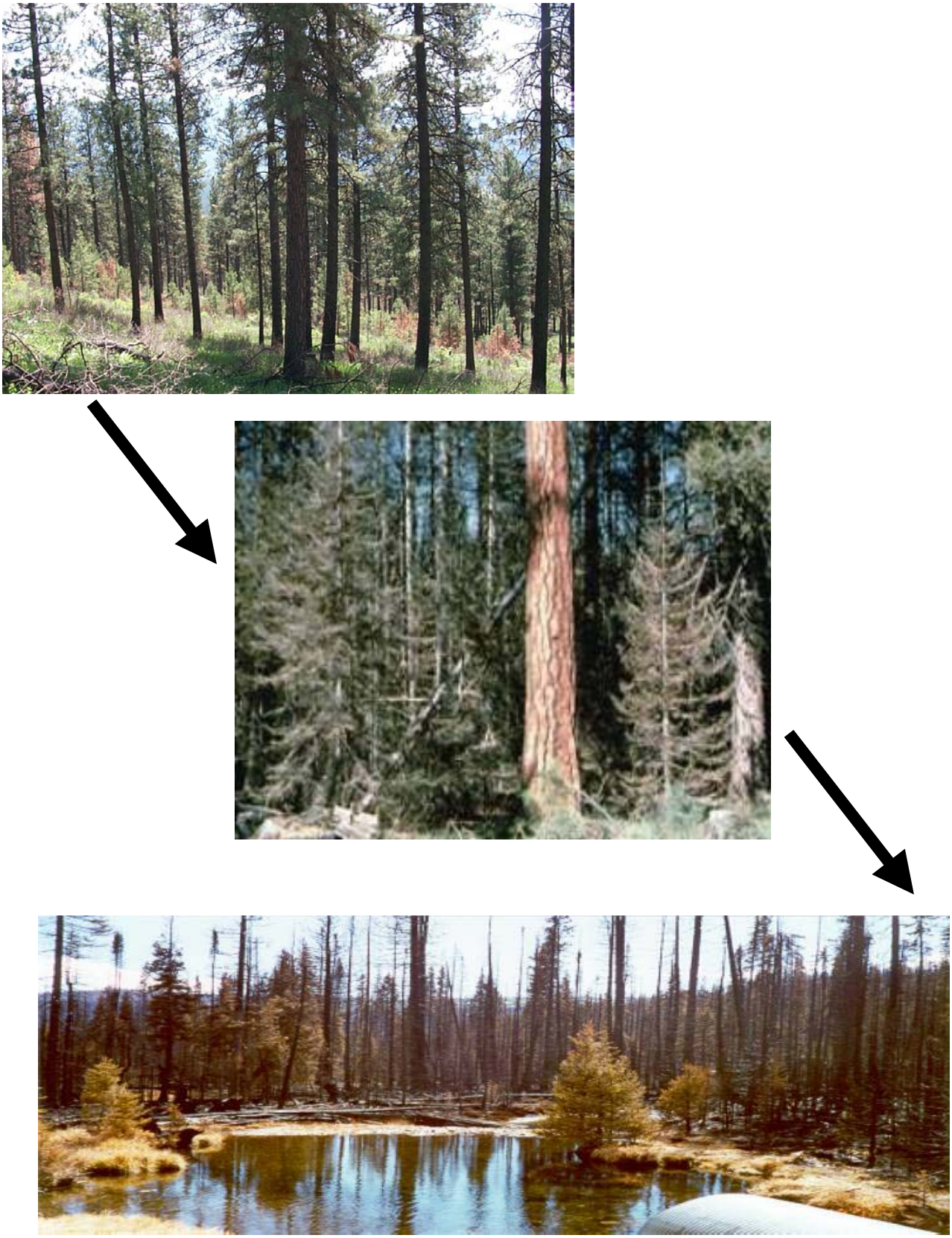
Under the No Action Alternative, it is assumed that fires would continue to occur within the project area. Furthermore, it is also assumed that these fires would continue to be actively suppressed. The State of Idaho Department of Lands and the Mt. Hall Volunteer Fire Department have the fire suppression 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 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.

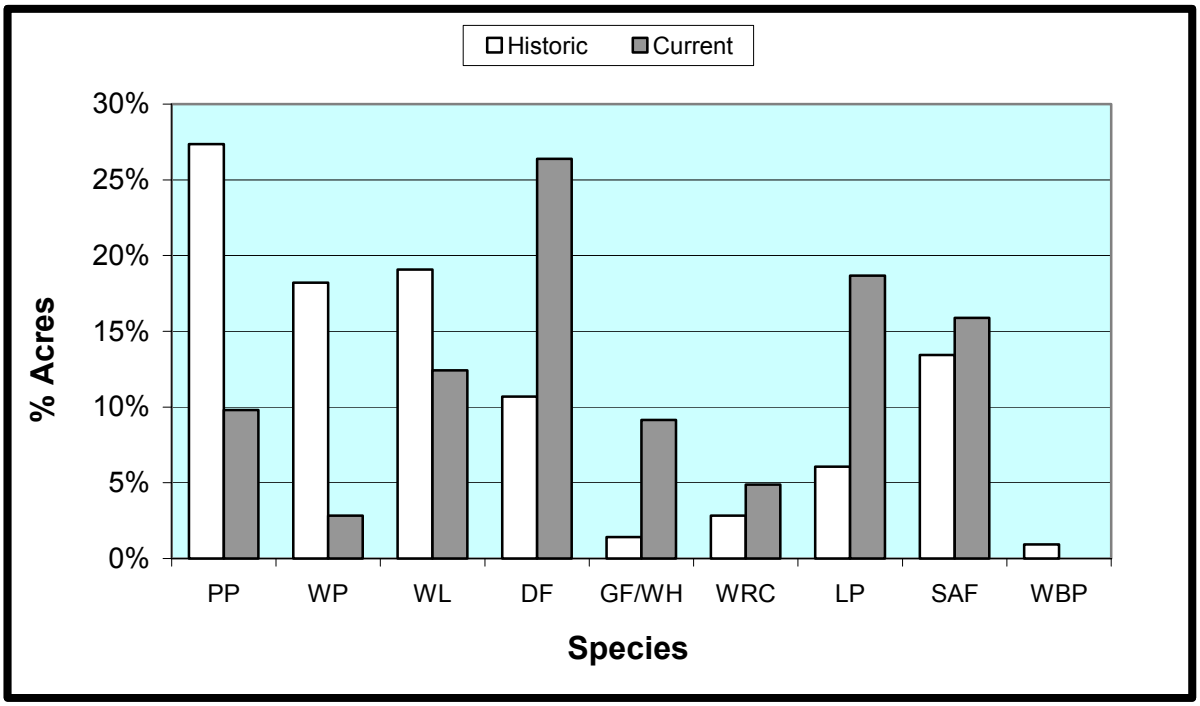
As a result, fires would burn with much more intensity than they did historically on these drier sites with much different outcomes. Old growth stands containing valuable "veteran" ponderosa pine that would have historically survived light intensity burns would likely be killed, and the risk of permanent 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. Historic and Current Forest Composition



Mission – Brush Project Area - Species distribution from a historical perspective.

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).

a. Direct, Indirect and Cumulative Effects

The direct, indirect and cumulative effects of Alternative 1 (No Action) would be:

- a continued trend away from HRV, the DFC, and 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.

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 the HRV. Approximately 1500 acres (7% of the project area) of white pine and larch forests would be trended toward their respective HRV. Less than 500 acres (2% of the project area) are located in the cool and moderately dry habitats.

a. Direct, Indirect and Cumulative Effects

In regards to forest composition, 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 the HRV.

- In the long term, there would be an increase in the percentage of long-lived seral species such as ponderosa pine, western larch, and white pine across the project area, trending toward values within the HRV 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.

3) Alternative 3

Alternative 3 would trend about 1750 acres (8% of the project area) of ponderosa pine type forest toward the HRV. Approximately 1120 acres (5% of the project area) of white pine and larch forests would be trended toward their respective HRV. Less than 360 acres (2% of the project area) are located in the cool and moderately dry habitats.

a. Direct, Indirect, and Cumulative Effects

Are similar to Alternative 2; the main difference is in the acres treated.
The overall effect to the ecosystem would be:

- a continued trend in the forest composition toward the respective values in the HRV, 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, The overall effect to the ecosystem would be: a decrease in insect and disease mortality, a lower probability of damage to the rural interface lands, life and property.
- a lower probability of damage to the rural interface lands, life and property.

4) Alternative 4

Alternative 4 would trend about *2300 acres* (10% of the project area) of ponderosa pine type forest toward the HRV. Approximately *950 acres* (4% of the project area) of white pine and larch forests would be trended toward their respective HRV. Less than 10 acres are located in the cool and moderately dry habitats of the project area.

a. Direct, Indirect, and Cumulative Effects

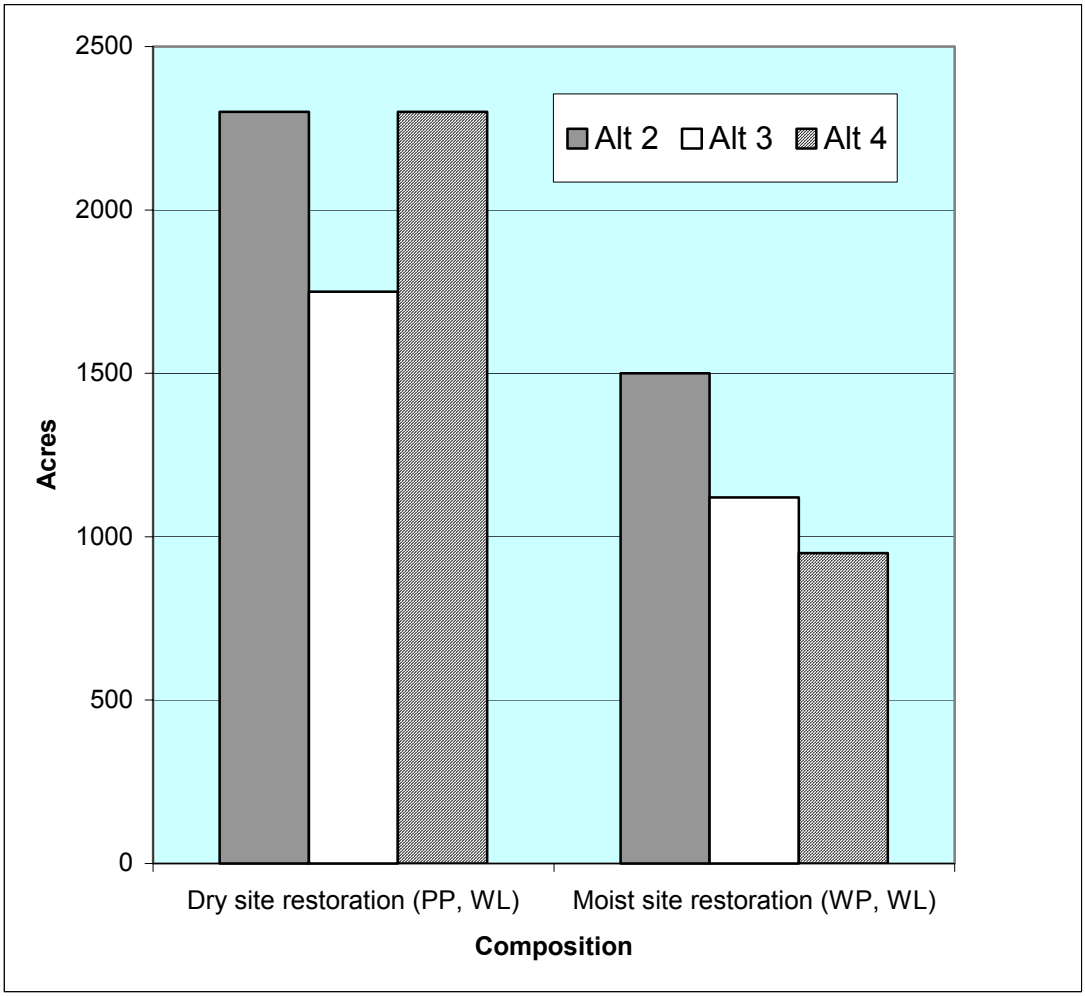
The overall effect to the ecosystem would be:

- a continued trend in the forest composition toward the respective values in the HRV, the DFC, and 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

5) All Action Alternatives

The changes in forest composition for each alternative are displayed in Figure 4-4.

Figure 4-4. Acres of Forest Composition Trended toward Historic Range of variability through Restoration Treatments



B. Forest Structure

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. The following summarizes projected changes under no action.

Changes in forest structure under Alternative 2 as projected with SIMPPLLE are summarized below:

- Older growth and mature forests would decrease from 31% to 6%
- Younger forest structures (openings and pole timber) would increase from 28% to 82%.

Figure 4-5. Projected Size Class Distribution with Natural Disturbances

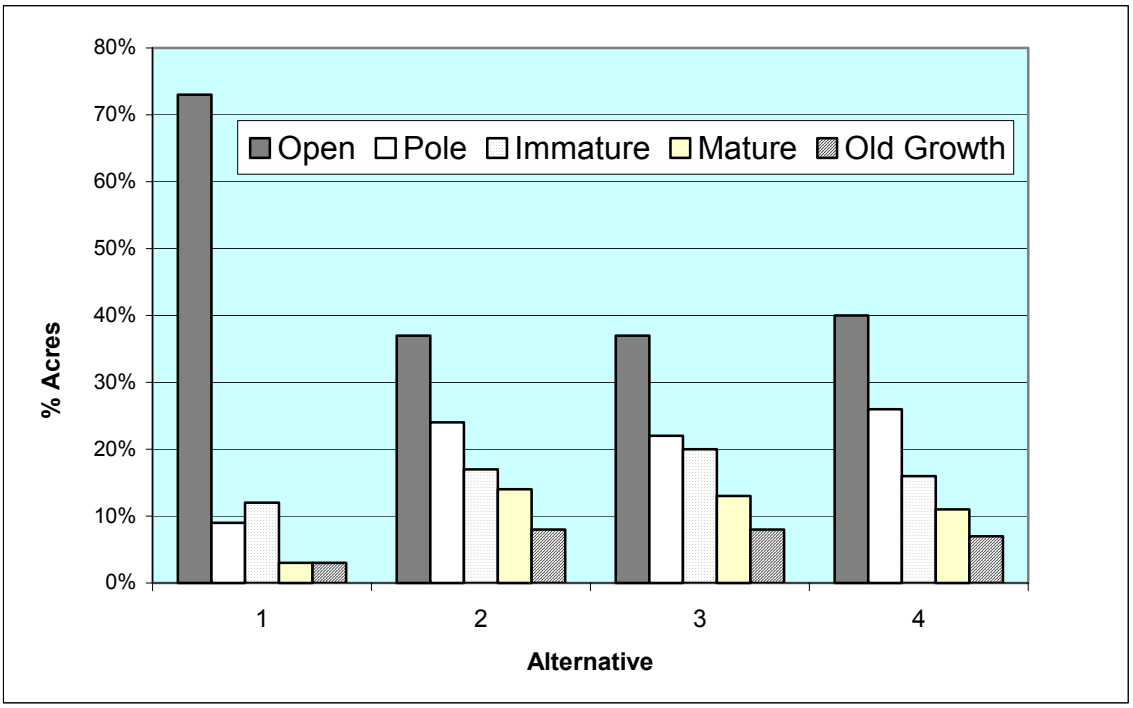
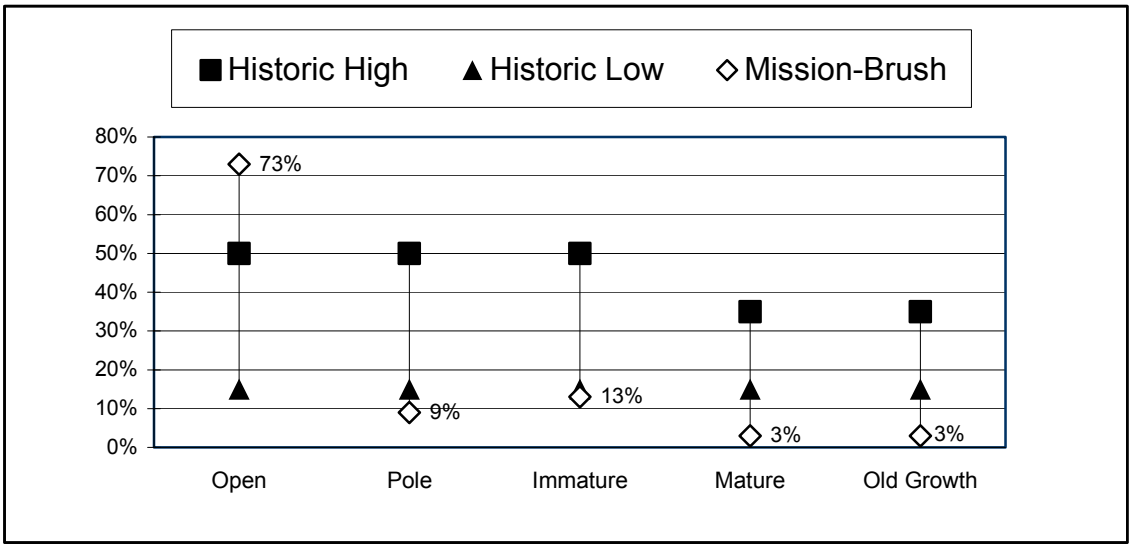


Figure 4-6. Mission Brush Forest Structure: Historic vs. Projected (Alternative 1)



b. Direct, Indirect & Cumulative Effects

The direct effects of Alternative 1 would be to maintain the dominance of multi-storied forest structures across the landscape. The 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.

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 below and 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

The direct, indirect, and cumulative effects of Alternative 2 would be to improve forest structure and the treated areas back toward their respective HRV. 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.

3) Alternative 3

a. Direct, Indirect and Cumulative Effects

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 below 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 4-7. Historic vs. Projected Forest Structure (Alternative 2)

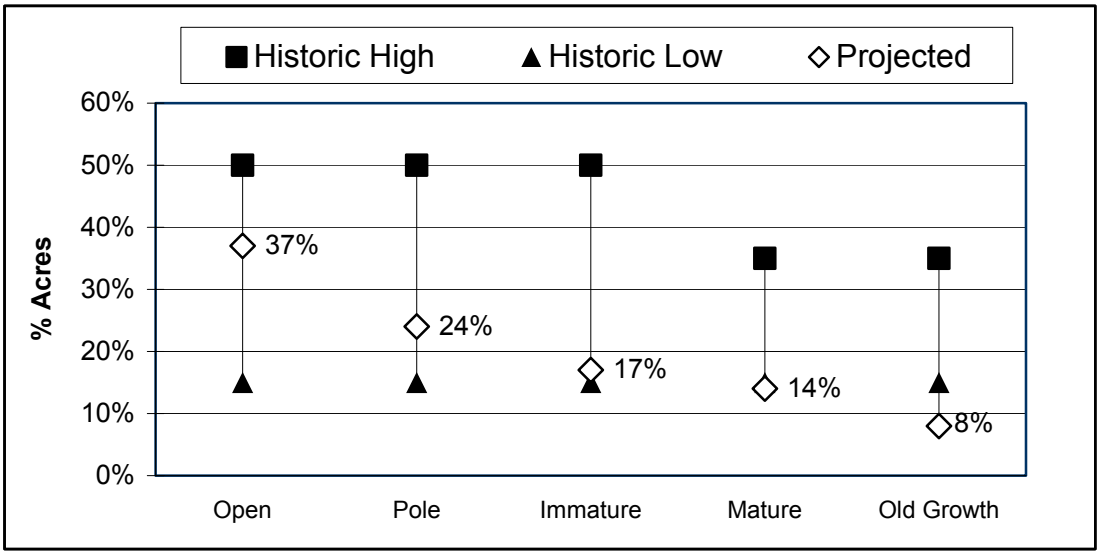
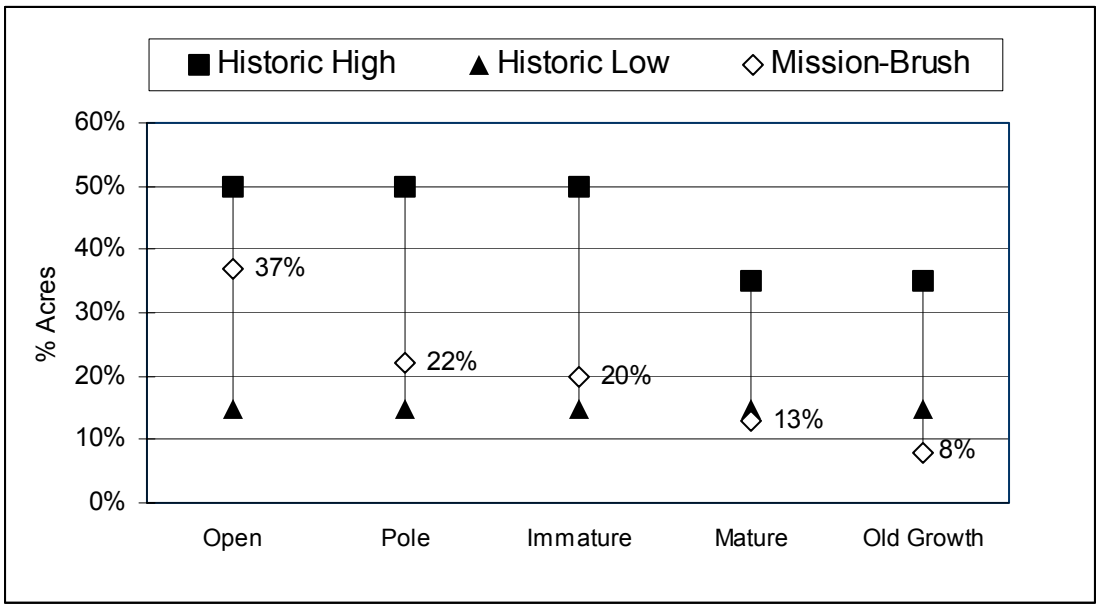


Figure 4-8. Historic vs. Projected Forest Structure (Alternative 3)



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 Table 4-1. 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.

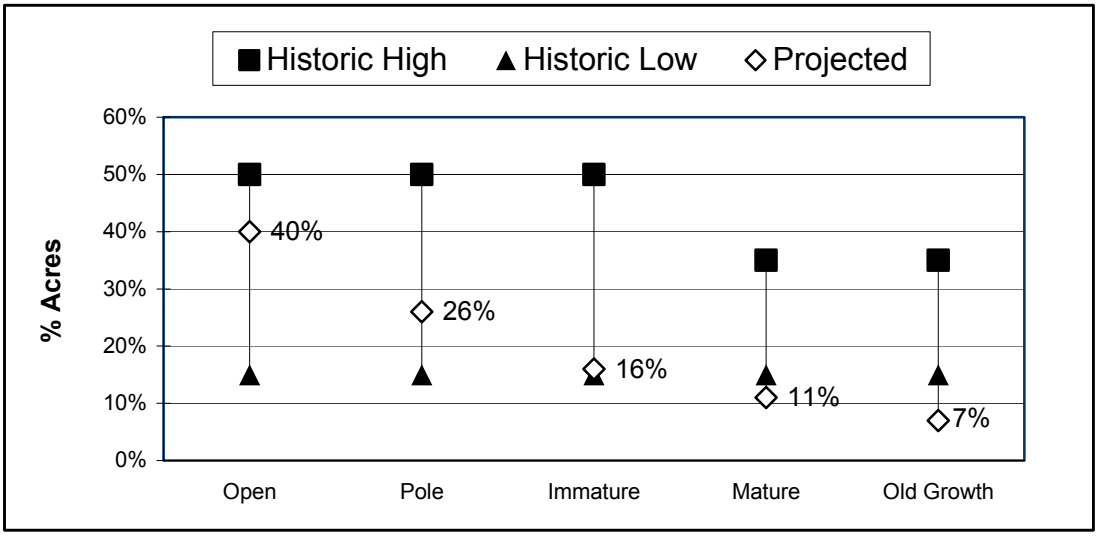
Table 4-1. Treatment Areas in Alternative 2; Not Included in Alternative 4

Unit	Acres
33	125
38	132
41	75
44	20
57	39
58	48
61	87
62	30
63	27
66	52
69	46
111	51
112	30
125	123
134	86
135	39
TOTAL	**1008**

Changes in forest structure under Alternative 4 as projected with SIMPPLLE are summarized below and in Figures 4-5 and 4-9:

- 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)



C. Forest Openings

As stated in the DEIS on pages 2-22, 2-31, 2-42, the proposed openings (and their estimated effects) that would exceed 40 acres have been incorporated into the watershed, wildlife, fire, and visual analysis design. The Bonners Ferry Ranger District is proposing these openings, as they are an integral part to ecosystem restoration in the project area. Exceeding 40-acre size openings for the Mission Brush project 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 LCAS (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 per alternative and how these larger openings would change the average opening size.

1) 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 through historic 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 Table 4-2.

2) 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 61 acres, which represents an increase of about 67%. A list of the openings greater than 40 acres for Alternative 3 is provided in Table 4-3.

Table 4-2. Openings Greater Than 40 Acres (Alternative 2)

Unit(s)	Unit Acres	Existing Opening Acres	Total Opening Acres
6, 7, 9	215	24 (Brush Lake)	239
19	67	NA	67
33	125	NA	125
38	132	21	153
41	75	40	115
57, 58, 60, 61, 62, 63, 66, 69	462	NA	462
111, 112	80	16, 24, 40	160
125	123	12, 18, 34	187
134	86	28, 33	147
140	128	NA	128

Table 4-3. Openings Greater Than 40 Acres (Alternative 3)

Unit(s)	Unit Acres	Existing Opening Acres	Total Opening Acres
6, 7, 9	215	24 (Brush Lake)	239
33	125	NA	125
38	132	21	153
57, 58, 60, 61, 62, 63, 66, 69	462	NA	462
111, 112	80	16, 24, 40	160
125	123	12, 18, 34	187
134	86	28, 33	147

3) 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 61 acres, which represents an increase of about 20%. A list of the openings greater than 40 acres for Alternative 4 is provided in Table 4-4.

Table 4-4. Openings Greater Than 40 Acres (Alternative 4)

Unit(s)	Unit Acres	Existing Opening Acres	Total Opening Acres
6, 7, 9	215	24 (Brush Lake)	239
19	67	NA	67
60,	133	NA	133
140	128	NA	128

D. Risk of Stand-Replacing Fire in Dry Forest Types

The risk of stand-replacing in dry forest types, as 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 these 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.

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 and therefore increase 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

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 adjacent private land, life and property. (Harvey et al. 1993).

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.

3) Alternatives 3 and 4

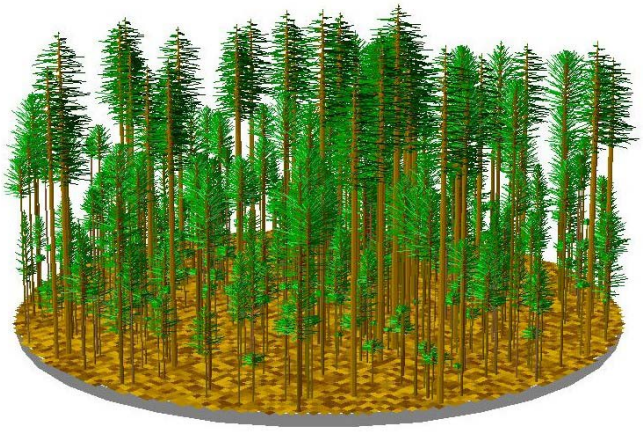
Under Alternatives 3 and 4, the SIMPPLLE model estimates that the probability of stand-replacing fire in the dry forest types within the project area would be reduced by 15%, and by about 40% within the treated stands. Both alternatives treat fewer acres of dry forest types than Alternative 2; Alternative 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.

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. Figure 4-11 provides illustrations and summaries of how a typical dry forest stand could look following such a fire. Figure 4-12 provides 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 Dry Wall 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 toward stand attributes with HRV.

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.

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).

1) Direct, Indirect and Cumulative Effects

a. 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.

b. 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.

c. 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.

d. 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.

e. All Action Alternatives

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 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 about 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. It estimated that only 50% of Units 6, 7, and 9 could be treated if opening sizes were limited to less than 40 acres. 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.

F. Air Quality

a. Effects Common to All Action Alternatives

Indirect effects, i.e., 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. Alternative 1

Alternative 1 includes no prescribed burning and no burning of activity fuels, therefore, would have no direct and cumulative effects on air quality.

c. 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 Tables 4-5, 4-6, and 4-7.

Based on estimates from FOFEM, Units 8, 30, 33, 38, 48, 57, 125, and 140 are over the EPA standard of 100 tons of particulate matter for any single pollutant / day. The combined emissions for all burning activities under Alternative 2,3, and 4 are estimated at 3054, 2460 and 2033 tons of particulate matter. 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. 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

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**

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)
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**
62	ISW	GP/UB	30	999	847	0.500	0.424	**28**
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**
129	CT/SS	GP	86	999	847	0.500	0.424	**79**
134	ISW	GP/UB	86	999	847	0.500	0.424	**79**
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 Acres			**4220**					**3054**

Table 4-6. Prescribed Burning Air Quality Analysis, Alternative 3

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**
62	ISW	GP/UB	30	999	847	0.500	0.424	**28**
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**

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)
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 Acres			**3364**					**2460**

Table 4-7. Prescribed Burning Air Quality Analysis, Alternative 4

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 Acres			3212					**2033**

G. 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. The costs of the alternatives analyzed in detail are disclosed below.

1) Alternative 1

a. Direct, Indirect and Cumulative Effects

Alternative 1 includes no prescribed burning or silvicultural treatments. Consequently, no direct costs or revenues would be generated under this alternative.

The indirect and cumulative effects of no action are subtle. 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. In the Mission Brush project area, as these systems trend further from historic conditions (e.g., loss of old growth ponderosas pine, declines in white pine and larch, etc.) the costs of restoration will increase over time.

2) Alternative 2

a. Direct, Indirect and Cumulative Effects

The direct total costs of restoration treatments under Alternative 2 would be over $3,500,000 (Table 4-8). 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). History on the Bonners Ferry Ranger District has shown that these types of sales are often bid up to twice their advertised rate, in this case $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 using the 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.

	Alternative 2	**Alternative 3**	**Alternative 4**
Value of Timber Harvested ($)	(+) 2,746,000 to 3,542,000	(+) 2,009,000 to 2,672,000	(+) 992,000 to 1,446,000
Brush Disposal (BD) Deposits from Timber Sale Receipts ($)	(+) 1,228,000	(+) $1,156,000	(+) 1,113,000
Underburning ($)	(-) 1,851,000	(-) 1,714,000	(-) 1,229,000
* Fireline Construction ($)	81,000	71,000	42,000
Burn Pile and Landings ($)	(-) 111,000	(-) 80,000	(-) 76,000
Grapple Piling ($) – fuel breaks *- landing piles *- yarding tops w/ helicopter	(-) 252, 000 11,000 96,000	(-) 178,000 9,000 96,000	(-) 171,000 8,000 96,000
Slashing Understory Fuels ($)	(-) 25,000	(-) 16,000	(-) 25,000
* - Limbing and Lopping Sawlogs ($)	47,000	39,000	26,000
Reforestation ($)	(-) 1,047,000	(-) 804,000	(-) 414,000
*Road Improvements	39 miles @ $161, 500	37 miles @ $158, 500	26 miles @ $62, 800
TOTAL Value ($)	(+) $688,000 to 1,484,000	(+) $373,000 to 1,036,000	(+) $190,000 to 644,000

Table 4-8. Restoration Costs for Alternatives 2, 3, and 4

**Costs are paid by purchaser. Values are rounded from appraisal estimates*

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.

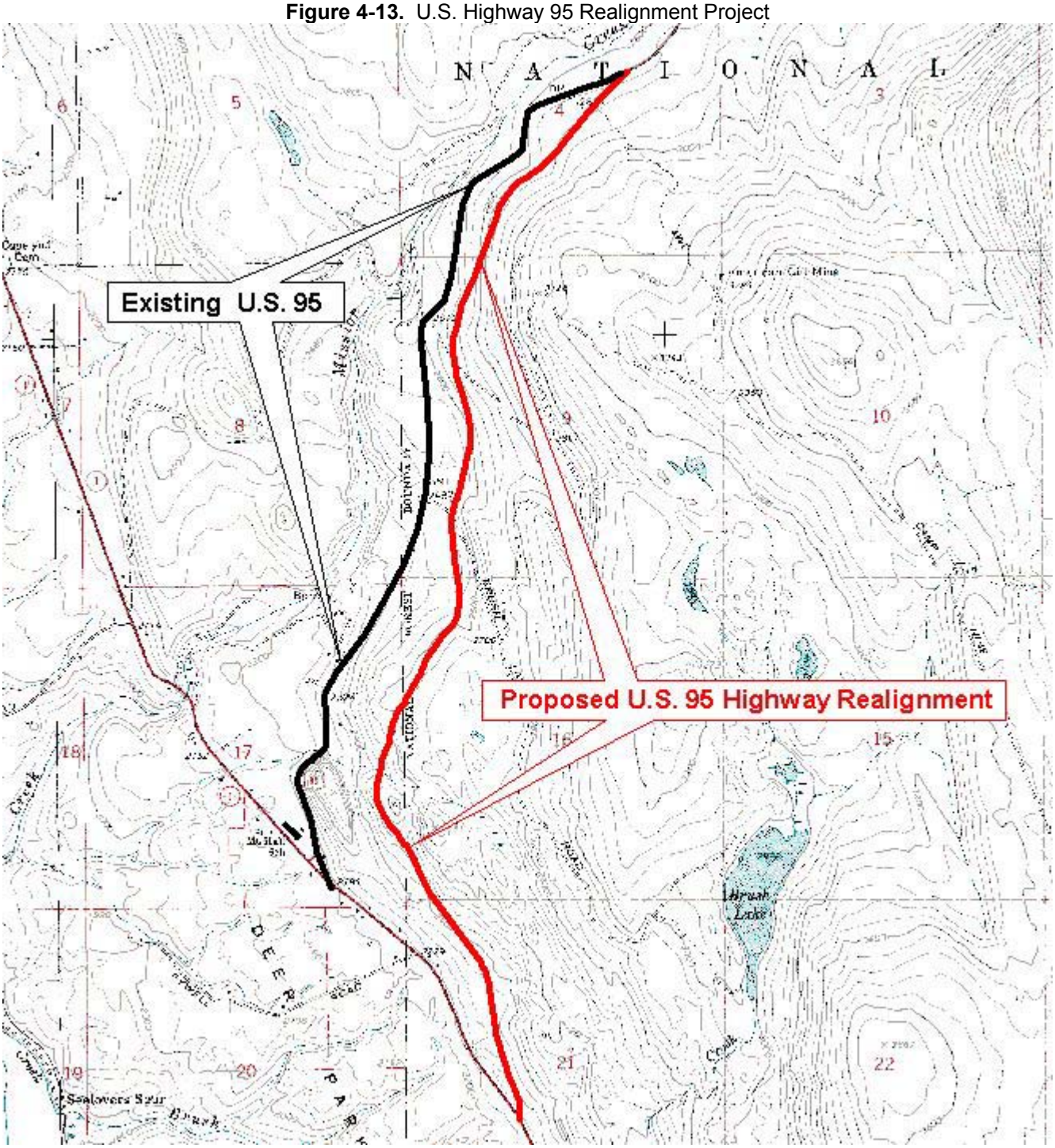
- Timber harvest on federal and private lands and within the Canadian portion of Mission Creek watershed. The cumulative effects of the past, present and future activities were included in the watershed analysis and integrated into the alternative development.

- US Highway 95 Realignment – The Idaho Department of Transportation is expected to start work on the project during the summer of 2003 and end in 2006. A map of the right of way (ROW) can be seen in Figure 4-13. Impacts to the Mission Brush project area include the loss of about 100 acres of forest stands, including 23 acres of allocated old growth, big game winter range, and increased risk of human-caused fires. The cumulative effects were included in the watershed analysis and integrated into the alternative development.

- Bonners Ferry Salvage Sales - The Bonners Ferry Ranger District Salvage Sales EA is scheduled for FY 2003. A map of the proposed action is available at the Bonners Ferry Ranger District upon request. Harvest of these trees is proposed to reduce hazardous fuels, restore productive stand conditions, and ecological function, or any one of these conditions, in areas affected by windstorms, insects, disease and other damaging events. The vegetative objectives of this proposal are consistent with the objectives of the Mission Brush EIS. The cumulative effects of this project would contribute toward vegetative restoration in the Mission Brush Project Area.

- Within Canada - In the East Fork Mission drainage, the TEMBEC Forest Products Company has tentatively scheduled a 40-hectare regeneration cut and approximately five kilometers of road would be constructed to access the Unit. This activity should take place in the next five years.

Figure 4-13. U.S. Highway 95 Realignment Project



I. Consistency with the Forest Plan

1) 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 483 acres (15%) of old growth.
- OGMU 20 is about 13,020 acres and contains 1,295 acres (10%) of old growth.

OGMU 19 and OGMU 20 encompass about 16,125 acres of National Forest, and 1778 acres or about 11% are included in the IPNFs old growth allocation. All 483 acres of OGMU 19 and 38 acres of OGMU 20 are considered dry forest old growth, for a combined total of 521 acres of dry forest old growth between the two management units. 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.

As part of the IPNF Forest Plan (1987) strategy, 10% of the total forested area, (roughly 51,000 acres) on Bonners Ferry Ranger District was allocated for old growth management, as directed in a letter from the Forest Supervisor on May 7, 1991. Currently the Kootenai sub basin (Bonners Ferry RD) has 64,625 acres (16%) allocated to old growth management. Refer to the "Forest Plan Monitoring and Evaluation Report 2002" for details on forest wide old growth status and why dry site old growth is so important to the IPNF.

a. Alternative 1

This alternative includes no entry into either moist site or dry site old growth stands.

Forest Plan standards for old growth maintenance and distribution would be met. However, the long-term integrity of dry forest old growth would be dubious, given the risk of stand-replacing fire would continue to increase over time. Historically, this type of old growth was characterized by open-grown stands of large diameter ponderosa pine and western larch that were maintained through frequent underburning.

Fire history data for the Mission Brush project area has revealed that the average fire return interval on these dry sites ranged from 15 to 35 years. Most stands where treatments are being proposed last burned over 80 years ago. On an individual stand basis, 80 years may be within the historical range; however, from a landscape perspective, the entire dry forest landscape in the Mission Brush area has been subject to 80 years of fire exclusion.

- This landscape level of fire exclusion is outside the historic range.

With no treatment, these stands would continue to meet the minimum Forest Plan old growth standards for size and age. However, with continued fire suppression and no mechanical treatments to reduce natural fuel loads, the risk of catastrophic fire would increase over time in these old growth forests. Such a fire would not only kill invading grand fir and Douglas-fir, but also the old, large-diameter, ponderosa

pine and larch diameter, ponderosa pine and larch that are providing the old growth structure of these stands. Returning fire into these dense stands, or those with understory (ladder) fuels, could fatally damage already stressed overstory trees.

- Even without catastrophic fire, competition from Douglas-fir and grand fir, which tend to "hog" water and nutrients on these sites, would eventually kill the older pine and larch. Furthermore, pine and larch would not be able to regenerate under a dense canopy of Douglas-fir and grand fir, even if there were a seed source of ponderosa pine and larch.

For these reasons, restoring ponderosa pine forests to more healthy and sustainable conditions will generally require some kind of silvicultural cutting (Hardy and Arno, 1996). These conclusions are consistent with ICBEMP findings (1996) for North Idaho forests where open grown, large-diameter, ponderosa pine and larch forests have been replaced with dense stands of small-diameter Douglas-fir and grand fir. The net result is a decrease in forest diversity throughout dry-site forests in North Idaho.

Forest Plan standards for old growth maintenance and distribution would be met in the short-term but is less certain in the long run.

b. Alternative 2

This alternative includes entry into 344 acres of dry site old growth stands. Treatments would be designed to restore the historic integrity of this type of old growth. 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.

This alternative would result in no net loss of allocated old growth. Consequently, Forest Plan standards for old growth maintenance and distribution would be met.

c. Alternative 3

This alternative includes entry into 310 acres of dry site old growth stands. Treatments would be designed to restore the historic integrity of this type of old growth. 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.

This alternative would result in no net loss of allocated old growth. Consequently, Forest Plan standards for old growth maintenance and distribution would be met.

d. Alternative 4

This alternative includes entry into 344 acres of dry site old growth stands. Treatments would be designed to restore the historic integrity of this type of old growth. 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.

This alternative would result in no net loss of allocated old growth. Consequently, Forest Plan standards for old growth maintenance and distribution would be met.

e. All Action Alternatives

Appendix E of the FEIS includes a list of all old growth stands in OGMU 19 and 20. Also included in Appendix E is a list of acres and old growth stands that would be treated under each action alternative and maps that correspond with each alternative. All of the old growth stands proposed for treatment are dry forest stands with improvement cut prescriptions that would be designed to trend these forests toward long-term sustainability.

2) Reforestation

a. Alternatives 2, 3, and 4

Regeneration harvests are proposed for stands under these alternatives. Site preparation and fuel reduction activities are planned to provide appropriate sites for planting. Following site preparation, usually underburning, regeneration would occur through artificial (planting) and natural methods. Stands would be planted with seral species (white pine, larch, and ponderosa pine) 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 a natural seed sources. This is 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 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.

3) Lands Suitable for Timber Production

a. All Alternatives

This project includes lands that were designated as unsuitable for timber production in the Forest Plan (MA9). Forest Plan Timber Standard 3, page II-32, allows for changes in land suitability classification based on recommendations of a certified silviculturist. In accordance with this standard, 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.

4.2 AQUATICS

A. Methodology

Ultimately, the effects of the project on stream channels are 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.

1) 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; the construction of Highway 95 reroute 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. The estimated direct and indirect effects analysis timeframe for water yields for all alternatives are through 2035, when water yields recover to baseline.

2) 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.

3) Sediment Risks/Benefits associated with road decommissioning and improvements - Analysis

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.

4) Mass Failure Potential in Hall Mountain Area – Analysis

In addition to buffering high mass failure potential landtypes (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.

B. 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.

1) Alternative 1

a. 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.

b. 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.

b. 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.

2) Alternatives 2, 3, and 4

a. Effects in Mission Creek Watershed

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. WATSED modeling results within the other sub-watersheds are less than or equal to the results presented below, therefore can be referenced within the project file.

1) Sediment Yield

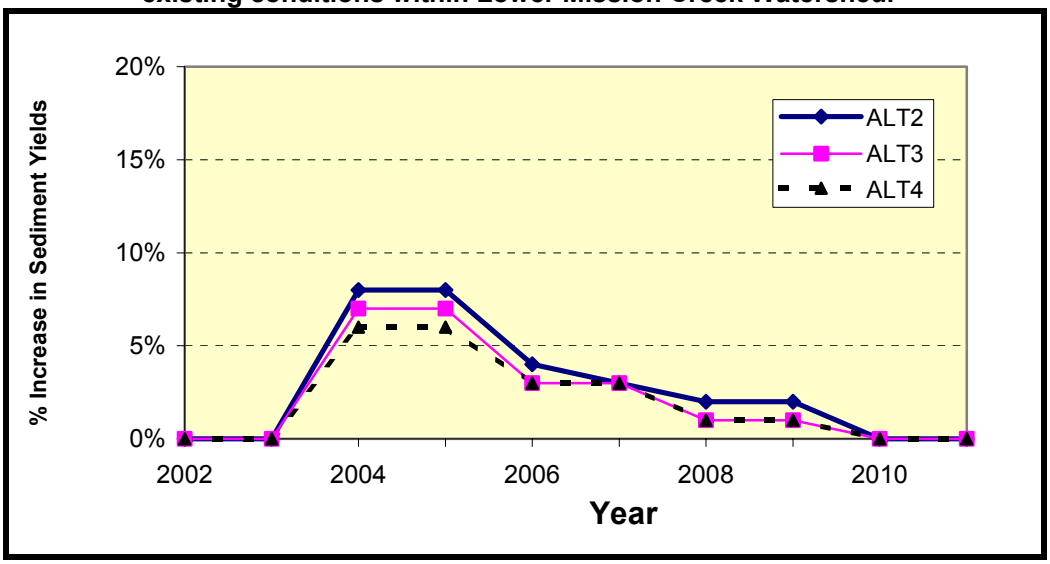
Changes in sediment yield values for the three alternatives over the term of the project are displayed in Figure 4-14 and within the watershed project file. Timber harvesting, wildlife burning and temporary road construction are modeled. These estimates do not include the reduction in sediment from the 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 4-14 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 at-risk culvert removal.

2) Estimated Effects of Timber Harvesting, Site Preparation and Temporary Road Construction on Sediment Yields

No temporary roads would be constructed under Alternative 3.

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.

Since temporary road construction activities proposed in Alternatives 2 and 4 do not occur on sensitive landtypes; only cross intermittent draws; are over 1,000 feet from Mission Creek or its tributaries; and incorporate design features described in Chapter 2, the risk of sediment delivery from road construction would be even less than predicted.

Alternatives 2 and 3 do not differ in Mission Creek Watershed except for construction of temporary roads. Since there is only a 1% modeled difference in sediment yields between the two alternatives, and that difference would not be measurable (see Sediment Yield above), and the recovery period is the same for both alternatives, no difference is expected in sediment yield between Alternatives 2 and 3 due to temporary road construction. This is true for Alternatives 3 and 4 also.

When the temporary roads are no longer needed, they will be decommissioned. The decommissioning of temporary roads will restore slope stability eliminate surface erosion, and eliminate the requirement for future road maintenance.

3) Effects of Road Decommissioning on Sediment

Alternatives 2, 3, and 4: Proposed road decommissioning and storage is the same for each alternative. Figures 2-9 and 2-10 and Tables 2-13 and 2-14 (FEIS; Chapter 2) 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 Table 2-13. A summary of the proposed road treatment miles by drainage area is listed in Table 4-9.

4-9. 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, in draft).

4) 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. Road storage is done 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.

Waterbarring roads is an approved BMP to use to prevent 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 discussed above (see Forest Plan Monitoring Reports, 1998-2000).

5) Effects of Road Improvement on Sediment Delivery

Road improvement on FSR-272, 272-A and 2206 would improve ditch drainage by 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.

6) 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: 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.

7) Water Yield modeled by WATSED

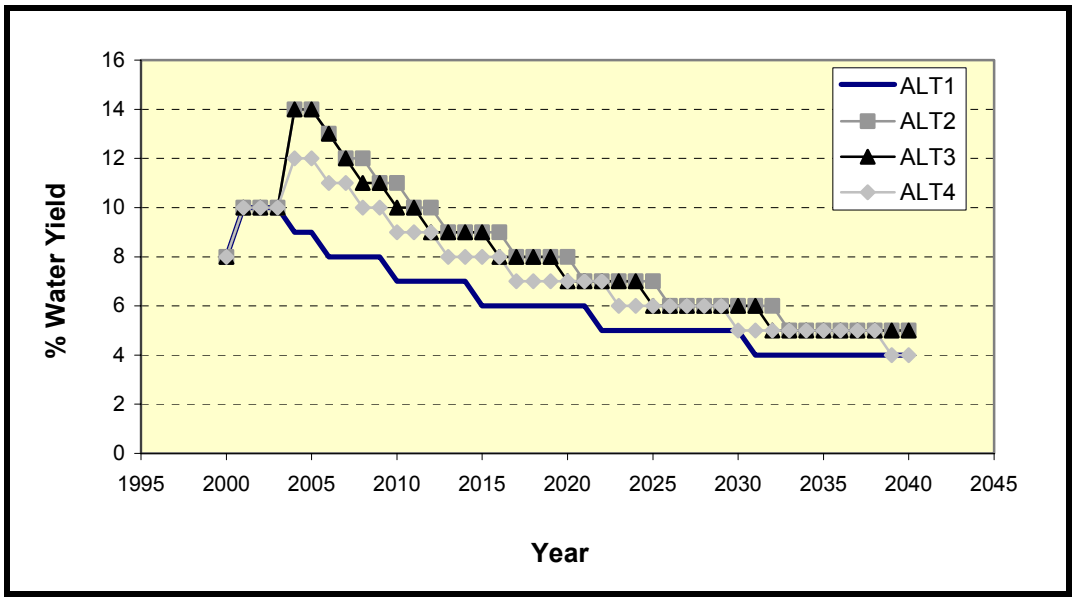
Decreased vegetative cover can result in increased runoff and increased sediment production, especially if roads capture this increased water yield, creating potential for saturated soils and mass failures on unstable road systems. Studies have shown that for these increased water yields to be measurable, 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 Figure 4-15.

Figure 4-15. Comparisons of water yield for Lower Mission Creek for all action alternatives.



Alternatives 2, 3, and 4: Increases in water yield in all three action alternatives are within the historic range of variability (HRV). 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 HRV 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.

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), the estimated changes in peak flows, sediment yields and the potential increases in flows from a rain-on-snow event, changes in stream channel morphology would not be exacerbated by any of the three action alternatives.

b. Effects in Brush Lake Area

Alternatives 2 and 4 propose the same harvest treatments. 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.

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. 3 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 because: 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

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.

3) Direct and Indirect Effects Common to All Action Alternatives (2, 3, and 4)

a. Hall Mountain Area

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 minimal soil disturbance and timing restrictions (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 irregular cut and commercial thin. Since these units are going to be helicopter logged and there would be no logging within the RHCAs, sediment delivery from these units is considered negligible. 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 were observed on the west face of Hall Mountain on steep ground 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.

Additionally, 0.5 miles of road on the 2217-C spur would be decommissioned to improve slope hydrology and minimize potential for failure in area of past failures.

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). 800 acres of treatment in the Hall Mountain area are located within the rain-on-snow zone. Of this, 256 acres would leave 20% canopy cover and 890 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. 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. 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).

b. Mission Creek Area

In this watershed, a maximum of 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, 595 acres would leave 70% canopy cover, 232 acres would leave on average 50% canopy cover, and 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.

c. Brush Lake Area

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).

C. Cumulative Effects Analysis Area

The cumulative effects analysis area is defined as he Brush Lake area, the West Hall Mountain Area and the Mission Creek watershed combined. 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 (FEIS; 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. 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.

1) 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.

a. Past Activities and Events

Mining
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 without any

BMPs. None of the mines are located near any perennial stream. 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).

Wildfires, timber harvest and road building on Forest Service and private lands and within the Project Area
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 of this document.

Reforestation Activities: native seeding and timber stand improvement (tree thinning and pruning in plantations)
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 of this document.

b. 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.

Various types of ***recreation i****ncluding hiking, motorized recreation on designated trails, horseback riding, fishing, camping, driving, berry picking, snowmobiling, and cross country skiing.*

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)

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 activities. 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 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 basin 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 Timber Sale 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. 157 acres are an irregular shelterwood that will treat off-site ponderosa pine. 75 acres will be a roundwood thinning. 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. No work has been completed on either sale. The termination date for Rock Pine is in 2004 and for Harebrush in 2006, with a possible extension of one year for either sale. If work is initiated on Rock Pine in 2003, the units harvested are located outside of the Brush Lake area (project file).

No additional effects to watershed or fisheries are expected to occur.

c. Reasonably Foreseeable Activities

Bonners Ferry Salvage Sales EA
Salvage opportunities, as described in Chapter 2, are not expected to cause additional effects to watershed or fisheries resources. The criteria stated in Chapter 2 ensures that no additional disturbance would occur (e.g. salvage must meet INFS guidelines, would not take place on high risk soils or where it may adversely affect floodplains, wetlands, or if it can adversely affect threatened, endangered, or sensitive fish species or their habitat; there would be no new road construction, and only existing skid trails would be used).

Fire Suppression
Fire suppression activities within the project area will continue to allow stands to progress towards climax vegetation conditions where stands are not treated.

Timber harvest on private lands
Timber harvest activities are also expected to occur on private land within the next 5 years (personal communication, Kennen McClintock, see project file). Approximately 320 acres may be salvaged with some overstory removal in the south half of section 29 between 2003 and 2008. Less than 180 acres in section 33 may be harvested (shelterwood) between 2003 and 2008. These numbers are estimated, and the exact year the activity may occur is unknown.

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.

Current and ongoing 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.

US Highway 95 Realignment
US Highway 95 realignment began in the summer of 2003, 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.

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 20% percent of unit 134. No increased effect on sediment yield or water yield is expected from this level of activity within a proposed shelterwood cut.

D. Cumulative Effects for all Action Alternatives

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 should 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.

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.

b. Fisheries

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.

2) Mission Creek Watershed

a. Watershed and Erosional Processes

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 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*.

3) Brush Lake Area

The harvest activities associated with the Harebrush and 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.

4) Hall Mountain Area

a. Mass Failure Risk

The prescription and location of the proposed units for this project would not increase the existing risk of failure. Continued road and skid trail building on private land that creates conditions where water is concentrated may increase the risk of mass failure. This effect would be the same for all action alternatives.

5) 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. 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.

E. Consistency with the Forest Plan and Other Regulations

1) IPNF Forest Plan

All alternatives meet the requirements of the IPNF Forest Plan for water resources and fisheries.

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.

2) 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.)

3) 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.

4) 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. There are no streams within the project area currently listed on the Idaho 303(d) list of water quality limited stream segments. Brush Creek and Mission Creek and its tributaries will be listed for temperature on the upcoming 2004 TMDL list (Dave Mosier, Idaho DEQ draft 303-d list, 2003). The requirements of the INFISH 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.

5) 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.

6) 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.

7) 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.

4.3 WILDLIFE

A. Introduction

This section displays and discusses the effects on those wildlife species identified in the preceding section 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.

B. 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 Chapters 1 and the Vegetation section of Chapter 4).

The appropriate scale or geographic bounds for a 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 (Table 4-10).

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 US Fish & Wildlife Service (USFWS) and the US Forest Service (USFS) have identified areas outside recovery zone boundaries known to be currently occupied by grizzly bears. The portion of occupied habitat within the Mission Brush project area was chosen as the cumulative effects analysis area for grizzly bear so that changes in road densities from project-related activities would not be diluted by an overly large analysis area. A comment was received questioning the adequacy of this cumulative effects area for 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 (USFS 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, and is the size of multiple home ranges for even highly mobile species such as goshawks. The eastern and southern boundaries of the project area are drawn along natural topographic divisions, such as watersheds. The western and northern extent of the cumulative effects area is drawn along political boundaries. While adjacent areas in Canada and private lands outside the IPNF Administrative Boundary may provide suitable habitat for some species analyzed, we lack data to adequately assess these areas, and therefore assume that they are providing no habitat for these species.

Table 4-10. Project impact zones and Issues Indicators for species analyzed

Species Analyzed	Cumulative Effects Area
Canada lynx	Lynx Analysis Unit
Grizzly bear	Deer Ridge Occupancy Area
Black-backed woodpecker	Project area w/in IPNF Administrative Boundary
Flammulated owl	Project area w/in IPNF Administrative Boundary
Northern goshawk	Project area w/in IPNF Administrative Boundary
Fisher	Project area w/in IPNF Administrative Boundary
Pileated woodpecker	Project area w/in IPNF Administrative Boundary
White-tailed deer	Project area w/in IPNF Administrative Boundary
Forest land birds	Project area w/in IPNF Administrative Boundary

C. Analysis of Selected Species

Table 4-11 displays the issue indicators that are used to measure effects on selected wildlife species and their habitats. 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.

An important concept in discussing habitat suitability is the distinction between capable habitat and suitable habitat. Capable habitat refers to the inherent potential of a site to produce the necessary biotic and abiotic components to support a given species. Suitable habitat refers to habitat that is currently providing the necessary components to support a species. Therefore, habitat that is unsuitable has the potential to develop into a suitable condition, but currently does not meet the habitat requirements of a species. Habitat that is not capable has no potential to develop into a suitable condition.

Table 4-11. Cumulative Effects Area

Species	Indicator
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
White-tailed deer	• Changes to critical mid-winter range
Forest land birds	• Changes to priority habitats and vegetative diversity

1) 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.

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 without (early successional forage) and with (late 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.

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 4-12 and 4-13.

Table 4-12. 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 (Alt 1)	2,839	28.5	961	9.6	276	2.8
Alt 2	2,532	25.4	1,951	19.6	1,266	12.7
Alt 3	2,575	25.9	1,878	18.9	1,193	12.0
Alt 4	2,652	26.6	1,016	10.2	331	3.3

Table 4-13. Effects of proposed activities on lynx habitat components for the Hall-Mission LAU

Lynx Habitat	Alternative			
	Existing Condition (Alternative 1)	Alternative 2	Alternative 3	Alternative 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)

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.

The potential effects on Canada lynx and its habitat were determined by predicting the change to habitat components that would result from each alternative.

a. Cumulative Effects Common to All Alternatives

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 earlier, these improvements would not result in any increase of over-snow vehicle use in the area.

b. Alternative 1

Direct and Indirect Effects – 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.

c. 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 4-12). 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 zero acres of 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. Treatments larger than 40 acres are also consistent with timber management conservation measures in the LCAS (USDA-USDI 2000), which states, "...vegetation treatments should be designed to approximate historical landscape patterns and disturbance processes

d. 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 4-12). 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.

e. 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 4-12). 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.

f. 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:

<u>Other Harvest Activities</u> - 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 displayed in Table 4-14

Table 4-14. Combined effects of Mission Brush alternatives and Northern Prairie proposed actions 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

Timber Stand Improvement – 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.

Potential Future Salvage - Future salvage would not trigger incremental impacts as long as established design and mitigation measures are followed, including:

- No salvage of patches <5 acres in size, unless LAU has >10% well-distributed, field verified denning habitat
- In affected areas of >5 acres, a minimum of 5 acres or 10% affected area must remain unharvested, unless LAU has >10% well-distributed, field verified denning habitat
- No salvage in LAUs with less than 10% field verified denning habitat.
- No salvage where activity would result in >30% of affected LAU(s) in currently unsuitable condition, or >15% change to unsuitable in 10 year period.
- No salvage where actions will adversely affect movement of lynx along important connectivity corridors.

g. 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.

h. 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 Forest Service 1987 p. II-6).

2) Grizzly Bear

Methodology

Since the Mission Brush area is outside the designated grizzly bear recovery zone, there were no standards guiding control of motorized access or manipulation of habitat at the time the DEIS was published. However, because the northern end of the project area has a historic pattern of grizzly use, the emphasis was to manage this area for improved habitat conditions for bears. Specifically, motorized access would be controlled so that there would be no net increase in open or total drivable road 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 (USFS 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 was 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 total miles of open roads per square mile in the bear use area. While there are several seasonally restricted roads within this area, these roads are only restricted during the big game hunting season, so from the standpoint of grizzly bear habitat they are effectively "open". Therefore, there is no difference between reported "open" and "total" road densities.

a. Effects Common to All Action Alternatives
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. As discussed in the DEIS (page 4-50), these developments would probably have a net benefit to grizzly bears by relieving recreational pressure on surrounding BMUs and the Deer Ridge Occupancy Area.

a. Alternative 1

Direct and Indirect Effects
Within the 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. 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.

b. Alternative 2

Direct and Indirect Effects
Alternative 2 proposes brushing of 0.55 miles of currently undrivable road (Road 2481H), which which would raise the total road density during project implementation from 3.32 miles/mile^2 to 3.34 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 densities in the Deer Ridge Occupancy Area would be reduced to 3.20 miles/mile^2, and open road densities 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.

c. Alternative 3

Direct and Indirect Effects
Road densities during harvest would be identical to those calculated for Alternative 2. When post-harvest road decommissioning is completed, total road densities would be reduced to 3.20 miles/mile^2, and open road densities 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.

d. 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, road densities would be reduced to 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.

e. 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:

<u>Other Harvest Activities</u> - 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 undrivable roads.

Potentially, implementation of Mission Brush Alternatives 2 or 3, along with the Northern Prairie project, could 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 undrivable 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 densities would be reduced to 2.86 miles/mile^2 in all action alternatives.

Timber Stand Improvement - Thinning young, small diameter trees would be designed to increase the overall health and vigor of the stands. While this activity may cause a minor disturbance to grizzly bears in the short-term, there would be no long-term effects.

Potential Future Salvage - Since salvage would take place in small pockets of dead, dying, or down trees, this activity would not result in measurable changes to forage availability. Because salvage would mainly occur in small areas of affected trees, disturbance related to this activity would be of an ephemeral nature. Road densities would not change as a result of this proposal.

Under current management, salvage opportunities are confined to areas within 200' of existing roads (personal firewood cutting), and certain past and proposed treatment areas. In the Deer Ridge Occupancy Area, this includes sales analyzed under the Good Grief Addie EA, and makes as many as 3,162 acres available for salvage/firewood cutting. The proposed Bonners Ferry Ranger District Salvage Sales would make this plus other past treatment areas available for salvage, and would also extend potential roadside salvage out to 1,200' from currently drivable roads. Under this proposed action, as many as 9,711 acres would be available for salvage in the Deer Ridge Occupancy Area. However, this many acres would not be salvaged in this area, since the Salvage Sales proposed action caps salvage at 8,000 acres across the entire District. Salvage harvest would take place on a relatively small percentage of the total acres on the District, and in very localized areas.

f. Conclusion

Alternatives 2, 3 and 4 may temporarily disturb grizzly bears if these activities take place during the bear activity season. However, these alternatives would also enhance foraging opportunities in the future. There would be no permanent increase of road miles in the bear use area as a result of this action. The proposed action may affect, but is not likely to adversely affect, grizzly bear or its habitat.

g. 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 Forest Service 1987 p. II-6). All action alternatives are also 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 direction for management of grizzly bear habitat in identified occupied areas outside Recovery Zones.

3) Black-backed woodpeckers

Methodology

The potential effects on the black-backed woodpecker and other snag dependent species were determined by estimating the change in distribution and quantity of snag habitat that would result from implementation of alternatives.

a. Cumulative Effects Common to All Alternatives

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.

The proposed recreational developments in the Brush Lake area would have very minor 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 action alternatives.

b. Alternative 1

Direct and Indirect Effects
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.

c. Cumulative Effects

While Alternative 1 does not alter existing conditions, the abnormal levels of fuels from years of fire suppression have altered historic fire regimes, resulting in possible catastrophic losses of potential habitat. Consequently, Alternative 1 may impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or the species.

d. 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 or post-harvest (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.

e. 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.

f. 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 II). 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 higher quality snags.

g. 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:

Other Timber Harvest - The ongoing Rock Pine timber sale will treat approximately 196 acres of habitat assumed to be providing snags. Similar to several Brush Lake units, this sale targets offsite ponderosa pine plantations. Density of large snags may be reduced slightly through harvest activities, but it is unlikely that these units would produce enough large snags to comply with Region 1 guidelines until the offsite ponderosa pine component is eliminated. As discussed above, these stands are already producing a significant amount of habitat for black-backed woodpeckers, and will continue to support this species - at slightly lower population levels - even after treatment activities cease.

Highway 95 Realignment – The Idaho Dept. of Transportation will be realigning US 95 in the Copeland area, which encompasses the area west of Brush Lake. This ongoing action includes clearing an area 200'-800' wide of all vegetation along the new right-of-way. Clearing this right-of-way will eliminate all snag habitat on approximately 168 acres within the cumulative effects analysis area.

Future Salvage Opportunities - Future salvage opportunities could cause some incremental impacts to snag habitat. Under current management, salvage opportunities are confined to areas within 200' of existing roads (personal firewood cutting), and certain past and proposed treatment areas. In the Mission Brush project area, this includes sales analyzed under the Rock Bottom EA, and makes as many as 2,781 acres available for salvage/firewood cutting. The proposed Bonners Ferry Ranger District Salvage Sales would make these plus additional past treatment areas available for salvage, and would also extend potential roadside salvage out to 1,200' from currently drivable roads. Under this proposed action, as many as 7,324 acres would be available for salvage in the Mission

Brush project area. However, it is highly unlikely that this many acres would be salvaged in the Mission Brush project area, since the Salvage Sales proposed action caps salvage at 8,000 acres across the entire District. Salvage harvest would take place on a relatively small percentage of the total acres on the District, and in very localized areas. Additional habitat loss due to tree removal would be partially compensated for by snag retention guidelines. As discussed in the effects analysis for the Mission Brush action alternatives, areas outside proposed units would continue to produce small to medium sized snags for black-backed woodpeckers, thus maintaining populations of this species at low endemic levels.

h. 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. 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.

i. 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).

4) 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.

a. Alternative 1

Direct and Indirect Effects
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 move 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.

b. Cumulative Effects

Cumulatively, Alternative 1 would not impact flammulated owls because it does not propose any actions or activities that would alter habitat conditions.

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.

c. 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 216 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 could be directly converted to suitable flammulated owl habitat through selective harvest of a portion of the secondary canopy layer.

Selective cutting units include approximately 204 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 II).

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 right-of-way clearing and road construction, and subsequent constant high-speed traffic, would make these stands undesirable 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 15 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 recognizes 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.

d. 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.

e. 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.

f. 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 Events and Activities - 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.

Other Timber Harvest - The ongoing Rock Pine timber sale will treat an additional 114 acres of capable flammulated owl habitat within the project area, none of which is currently suitable. If left

untreated, these stands would probably not achieve a suitable condition for flammulated owls without a stand-replacing event. Like the proposed action, this sale would trend habitat toward suitable condition more quickly than no action would.

Highway 95 Realignment - Any suitable, or capable, habitat within the Highway 95 right-of-way corridor will be permanently lost. In addition to habitat loss, the realignment will displace the disturbance effect from the highway slightly further to the east in the southwest corner of the project area. Clearing the right-of-way will eliminate 148 acres of capable habitat, including 16 acres of currently suitable flammulated owl habitat, in addition to those acres affected by the proposed activities.

Timber Stand Improvement - 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. Consequently, thinning actions would promote long-term stability of habitat conditions for flammulated owls.

Potential Future Salvage - Future salvage would not trigger incremental impacts as long as established design and mitigation measures are followed because there would be no impacts to forest structure that is relevant to flammulated owls. All ponderosa pine, larch and cedar snags that are 20-inches diameter-at-breast-height (dbh) and larger will be left in the project area unless they are in areas that would be difficult to protect from personal use firewood cutters. Where 20-inch dbh and larger snags are not present, the largest snags available will be left to meet Region 1 Snag guidelines. If there are not enough snags or just enough snags in the salvage area to meet the guidelines, salvage of snags will not take place unless these snags are in the IPNF Forest Plan areas available for personal use firewood cutting. Implementation of the proposed action would not change the general distribution of flammulated owls because all potential nest trees would be protected from salvage operations. All snags ≥14" diameter would be excluded from salvage within capable flammulated owl habitat. Removal of standing dead <14" diameter would have no impact on the remaining overstory canopy cover and the suitability of the stand to support this species.

g. Conclusion

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 a beneficial effect on flammulated owls. However, this effects call is based on expected long-term (in this case, approximately ten years or more) changes to available habitat for these species, but may overlook possible short-term (<10 years) effects to available habitat. 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 impacts to these species in the immediate vicinity of harvest units. Despite the expected long-term benefits to these species, the short-term effects warrant a change in determination of effect to *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*.

h. 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).

5) 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 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 much of these stands to 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 hence overestimates the number of suitable acres affected by activities. After conducting site visits and evaluating unit descriptions, there is evidence that some of the "suitable" acres proposed for treatment are not currently suitable. Field surveys of the known goshawk nests in the project area indicate that goshawks may nest in small, suitable patches of otherwise unsuitable habitat.

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.

a. Alternative 1

Direct and Indirect Effects

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.

Cumulative Effects
Cumulatively, Alternative 1 would not impact northern goshawks because it does not propose any actions or activities that would alter habitat conditions.

b. Effects Common to All Action Alternatives

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. (1991) 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 is 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 24, 2004.) As a result, Unit #20 has been modified to include a 30-acre exclusionary zone that encompasses both the newly discovered nest site as well as the 1992 nest tree and environs.

The northern (remaining) portion of Unit #20 would 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 15 feet high, and an overstory becoming more crowded with immature Douglas-fir and cedar. We maintain that this portion of the unit is not suitable goshawk nesting habitat, and is becoming even more congested with time.

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. (1991, 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 action.

c. Alternative 2

Direct and Indirect Effects
Alternative 2 would treat approximately 2,615 acres of capable habitat, 244 acres of which are modeled as currently suitable. More than one-half (1,352 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 142 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 (see "Effects Common to All Action Alternatives", above), 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 1,352 capable acres treated by selective harvest in this alternative should move into suitable habitat condition over time. At the same time, as many as 155 acres of currently suitable habitat will be converted to unsuitable condition by regeneration harvest. While regeneration treatments in this alternative may delay 883 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 10 in this alternative.

d. Alternative 3

Direct and Indirect Effects
Alternative 3 proposes treating 1,912 acres of capable goshawk habitat, of which 171 acres are currently suitable. Approximately 1,070 acres would be treated by selective harvest, while 842 acres would be regenerated. This alternative proposes regeneration of only 97 acres of habitat modeled as currently suitable, since Units #19 and #140 would be dropped.

Alternative 3 would trend 996 acres toward suitability. An additional 745 acres would be set back by regeneration harvest, and 95 acres would no longer be suitable. Once again, these 758 acres may not reach suitable conditions without management intervention or a stand-replacing event. This alternative would result in 11 contiguous nesting stands of 30 acres or larger.

e. Alternative 4

Direct and Indirect Effects
Alternative 4 would treat approximately 2,138 acres of capable goshawk habitat, 196 acres of which are modeled as currently suitable. Only 592 acres would be treated by regeneration harvest, including 83 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 1,297 acres toward suitable habitat condition more rapidly than no action would. Regeneration will eliminate 83 acres from suitability, and 509 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 all 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.

f. Cumulative Effects Common to Alternatives 2, 3, and 4

The proposed recreational developments in the Brush Lake area would not affect Northern goshawk, since these improvements would not be in the vicinity of any currently suitable nesting stands larger than 30 acres. As stated in the DEIS (p. 4-50), wildlife acclimated to the current amount of disturbance around the lake are unlikely to be displaced by increased use. Similarly, wildlife acclimated to the present use of old skid roads as ATV trails in the area would not be measurably impacted by "official" designation of these as OHV trails

Existing condition and projected changes of Vegetation Structural Stages (VSS) were overlooked in the DEIS. Analysis of VSSs within *capable goshawk habitat* in the project area gives the results displayed in the following tables.

Table 4-15. **VSS percentages within Mission-Brush Project Area**

VSS	Size Class	Existing %	Alt 2 %	Alt 3 %	Alt 4 %
1	Open	0.6	8.4	6.8	4.4
2	Seed/Sapling	21.0	21.0	21.0	21.0
3	Imm/Pole	11.5	11.1	11.2	11.2
4	Imm/Medium	28.5	25.4	26.0	26.4
5	Mat/Large	29.2	24.9	25.7	27.8
6	Old Growth	9.2	9.2	9.2	9.2

*Percentages reflect post-treatment condition for each alternative.

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 11,300 acres. Dividing the project area at Highway 2 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 5,600 acres, while the area south of the highway (Brush Lake) is approximately 5,700 acres. Existing VSS distribution and projected post-harvest distribution are shown below:

Table 4-16. **VSS percentages within Hall / Mission portion of Project Area**

VSS	Size Class	Existing %	Alt 2 %	Alt 3 %	Alt 4 %
1	Open	0.5	9.5	9.5	2.6
2	Seed/Sapling	33.0	33.0	33.0	33.0
3	Imm/Pole	2.1	1.9	1.9	2.1
4	Imm/Medium	11.6	9.2	9.2	10.4
5	Mat/Large	39.1	32.7	32.7	38.3
6	Old Growth	13.8	13.8	13.8	13.8

*Percentages reflect post-treatment condition for each alternative.

Table 4-17. **VSS percentages within Brush Lake portion of Mission-Brush Project Area**

VSS	Size Class	Existing %	Alt 2 %	Alt 3 %	Alt 4 %
1	Open	0.6	7.6	4.4	7.6
2	Seed/Sapling	9.4	9.4	9.4	9.4
3	Imm/Pole	20.8	20.2	20.5	20.2
4	Imm/Medium	44.8	40.9	42.0	40.9
5	Mat/Large	19.6	17.3	19.0	17.3
6	OldGrowth	4.8	4.8	4.8	4.8

*Percentages reflect post-treatment condition for each alternative.

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-1970's. As a result, large percentages of this area are in VSS 5 and 6, and also in VSS 2. By contrast, much of the Brush Lake area experienced stand-replacing fires in the 1940's – 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.

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for northern goshawk:

Past Events and Activities - 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 northern goshawks by promoting and maintaining a more open forest structure.

Other Timber Harvest - The ongoing Rock Pine timber sale will treat an additional 234 acres of capable habitat within the project area, none of which is currently suitable. It is unlikely that these stands, if left untreated, would achieve a suitable condition for goshawks without a stand-replacing event due to the high density of stems in the understory. Like the proposed action, this sale would trend habitat toward suitable condition more quickly than no action would.

U.S. Highway 95 Realignment –Any suitable, or capable, habitat within the U.S. Highway 95 Right-of-Way will be permanently lost. In addition to habitat loss, the realignment will displace the disturbance effect from the highway slightly further east in the southwest corner of the project area. Clearing the right-of-way will eliminate 141 acres of capable habitat, including 20 acres of currently suitable goshawk nesting habitat, in addition to those acres affected by the proposed activities.

Timber Stand Improvement - 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. Consequently, thinning actions would promote long-term stability of habitat conditions for northern goshawks.

Potential Future Salvage - Future salvage would not trigger incremental impacts as long as established design and mitigation measures are followed because there would be no impacts to forest structure that is relevant to northern goshawk. Specifically, no salvage operations would take place within a minimum 30-acre buffer surrounding known or discovered nests to protect the integrity of the nest stand structure. In addition, a limited operating season (no harvest March 15 – September 1) would be applied to harvest units in which evidence of territorial nesting goshawks is found during sale preparation, harvesting, or post-sale activities. Exclusion of Riparian Habitat Conservation Areas (RHCAs) and old growth would protect and maintain some of the best goshawk habitat. Furthermore, the salvage of standing dead should have no impact on goshawks because they typically nest in live trees.

g. 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 (10 years or less) impacts to goshawk habitat will be offset by long-term (10 years or more) 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. 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.

h. 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).

6) 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. 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.

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.

a. Alternative 1

Direct and Indirect Effects
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.

Cumulative Effects
Cumulatively, Alternative 1 would not impact fisher because it does not propose any actions or activities that would alter habitat conditions.

b. Alternative 2

Direct and Indirect Effects
Alternative 2 would treat approximately 1,865 acres of capable habitat, 454 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.

c. Alternative 3

Direct and Indirect Effects
Alternative 3 represents an intermediate between Alternatives 2 and 4 concerning fisher habitat. This alternative would treat approximately 1,468 acres of fisher habitat, 398 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 Alternative 3 would retain 29 acres of suitable fisher denning habitat that would be treated in Alternative 2. However, Alternative 3 would do less to reduce wildfire risk , and potential elimination of suitable habitat, in this area.

d. Alternative 4

Direct and Indirect Effects
Because this alternative drops most of the units in the Mission Creek drainage, only 1,051 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 56 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.

e. Cumulative Effects Common to Alternatives 2, 3, and 4

The modification of Unit #20 to accommodate a historical goshawk nesting stand would reduce treatment of capable fisher habitat by 26 acres in the Mission Creek area, and would reduce treatment of suitable habitat by 5 acres. These acres of treatment would have been regenerated in Alternatives 2 and 3, and selectively harvested in Alternative 4.

The proposed recreational developments in the Brush Lake area would have very minor effects on fisher, since 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."

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for fisher:

<u>Past Activities and Events</u> - 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. There will be no increases in access with any of the alternatives, so there will be no decrease in security for fisher.

<u>Other Timber Harvest</u> - The ongoing Rock Pine timber sale will treat an additional 120 acres of capable fisher habitat within the project area, none of which is currently suitable.

<u>Highway 95 Realignment</u> – Any fisher habitat within the Highway 95 right-of-way will be permanently lost. In addition to habitat loss, the realignment will displace the disturbance effect from the highway slightly further east in the southwest corner of the project area. Besides those acres affected by the proposed activities, clearing the right-of-way will eliminate 20 acres of capable fisher habitat, none of which are currently suitable. Since the realigned part of the highway is outside fisher habitat, it is unlikely that there will be an increased mortality risk for fisher.

Potential Future Salvage - Future salvage is unlikely to trigger incremental impacts to fisher for the following reasons: exclusion of Riparian Habitat Conservation Areas (RHCAs) and old growth would protect and maintain the best fisher habitat. Furthermore, like lynx and wolverines, fishers seem to prefer more remote areas to roam and feed. In general, the project area is located on a portion of National Forest lands characterized by open and restricted roads and past timber harvest. While these areas do provide some foraging opportunities for fisher, they do not represent the secure habitat that fishers seem to prefer. Finally, salvage of standing dead and/or downed woody material in these less secure areas would follow Region 1 Snag Guidelines (USDA 2000) and down woody guidelines (Graham et al. 1994) and include construction of grapple piles for wildlife habitat. Where grapple piling is conducted, approximately one grapple pile for every two acres piled will be left for wildlife habitat enhancement. The latter would mitigate for any occasional use of these areas by fisher.

f. Conclusion

Across the landscape, fisher habitat is maturing at a faster rate than it is being lost. The net result is an increase in fisher denning habitat along with a decrease in foraging habitat. 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. 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.

g. 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).

7) Pileated Woodpecker

Methodology

Pileated woodpecker 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. Direct and indirect effects reflect a change in habitat conditions that would result from implementation of the alternatives. Snag habitat for nesting is considered more limiting than foraging habitat as discussed in the Affected Environment section. Nesting habitat is dependent on the age and size of trees, which makes pileated woodpeckers a good indicator of older, larger-diameter trees and late-successional forests. Specific parameters analyzed for this assessment include the change in distribution and quantity and quality of large snag habitat.

a. Cumulative Effects Common to All Alternatives

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.

b. Alternative 1

Direct and Indirect Effects
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, there would be little consequence to pileated habitat because there would only be loss of a small amount of mature and old growth habitat components.

Cumulative Effects
Cumulatively, Alternative 1 would not impact pileated woodpeckers because it does not propose any actions or activities that would alter habitat conditions.

c. Alternative 2

Direct and Indirect Effects
Across the entire cumulative effects analysis area, 3,098 acres of capable pileated woodpecker habitat would be treated. Most 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. Three-quarters of the capable habitat in this area does not presently provide 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 old growth that occurs within this portion of the Mission Brush project area (dry habitats) that would be affected by cutting prescriptions, specifically Units 3, 4 and 140. The prescriptions for these units are improvement cut (Units 3 & 4) or irregular shelterwood (Unit 140). In each case, 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 will also take place in inventoried dry-site old growth (Units 22, 26, 28 and 30). As with the Brush Lake area, these units are 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.

Treatment of dry sites to remove competing understory trees so that the stands resemble the more open, historic 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 falldown 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.

d. Alternative 3

Direct and Indirect Effects

Alternative 3 proposes harvest on 2,369 acres of capable pileated woodpecker habitat. Approximately 1,024 acres of currently suitable habitat would be treated by selective harvest, while 282 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. As in Alternative 2, 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.

e. Alternative 4

Direct and Indirect Effects
Alternative 4 would harvest 2,788 acres of capable pileated woodpecker habitat. Approximately 171 currently suitable acres would be regenerated. Like Alternatives 2 & 3, Regional snag retention guidelines will ensure that there would be no long-term decrease in suitable pileated woodpecker nesting habitat from these activities.

f. Cumulative Effects Common To Alternatives 2, 3, and 4

The modification of Unit #20 to accommodate a historical goshawk nesting stand would reduce treatment of suitable pileated woodpecker habitat by approximately 34 acres in all action alternatives. These acres of treatment would have been regenerated in Alternatives 2 and 3, and selectively harvested in Alternative 4.

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.

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for pileated woodpeckers:

<u>Past Activities and Events</u> - Although the proposed actions would reduce the quantity of snag habitat, older, large diameter snags are lacking on the landscape due to past large-scale fires. There are a few large, fire residual snags scattered throughout the analysis area, but not in concentrations that would support nesting territories of pileated woodpeckers.

<u>Highway 95 Realignment</u> – Clearing the Highway 95 right-of-way will eliminate all snag habitat on approximately 168 acres within the cumulative effects analysis area.

<u>Future Salvage Opportunities</u> - Future salvage opportunities could cause some incremental impacts to snag habitat. Under current management, salvage opportunities are confined to areas within 200' of existing roads (personal firewood cutting), and certain past and proposed treatment areas. In the Mission Brush project area, this includes sales analyzed under the Rock Bottom EA, and makes as many as 2,781 acres available for salvage/firewood cutting. The proposed Bonners Ferry Ranger District Salvage Sales would make these plus additional past treatment areas available for salvage, and would also extend potential roadside salvage out to 1,200' from currently drivable roads. Under this proposed action, as many as 7,324 acres would be available for salvage in the Mission Brush project area. However, it is highly unlikely that this many acres would be salvaged in the Mission Brush project area, since the Salvage Sales proposed action caps salvage at 8,000 acres

across the entire district. Salvage harvest would take place on a relatively small percentage of the total acres on the district, and in very localized areas.

Since the Northern Region snag protocol (USDA 2000) would be followed, pileated woodpecker habitat loss due to tree removal would be partially compensated for by these snag retention guidelines. Additional protective measures for snag-dependant species that will be implemented are:

1) All standing non-merchantable dead trees (i.e. hollow or rotten trees) will be retained, except those that are hazardous to logging operations, for snag dependent wildlife and large woody debris recruitment;
2) No cottonwood, aspen or birch snags will be commercially salvaged;
3) Standing non-merchantable snags will not be counted toward the amount needed to meet the Region 1 Snag guidelines;
4) All ponderosa pine, larch and cedar snags that are 20-inches diameter-at-breast-height (dbh) and larger will be left in the project area unless they are in areas that would be difficult to protect from personal use firewood cutters;
5) Where 20-inch dbh and larger snags are not present, the largest snags available will be left to meet Region 1 Snag guidelines; and
6) If there are not enough snags or just enough snags in the salvage area to meet the guidelines, salvage of snags will not take place unless these snags are in the IPNF Forest Plan areas available for personal use firewood cutting.

Timber Stand Improvement - 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. Consequently, thinning actions would help promote long-term stability of habitat conditions for pileated woodpeckers.

g. Conclusion

The proposed project incorporates design features that maintain minimum numbers of snags within the harvest units. In addition to this, numerous snags are being created outside of the proposed units that would not be treated (Behrens 2004). This is true over the entire Idaho Panhandle as well as the North Zone. 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. No treatments are proposed that would reduce old growth structure or integrity.

Consequently, Alternatives 2, 3 and 4 may impact pileated 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.

h. Consistency with Forest Plan and Other Regulations

All proposed alternatives would meet and exceed Forest Plan goals and objectives for managing snag habitat (USDA Forest Service 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).

8) 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.

a. Alternative 1

Direct and Indirect Effects
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.

Cumulative Effects
Alternative 1 would not have cumulative effects to white-tailed deer because it does not propose any actions or activities that would alter habitat conditions.

b. 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.

c. 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.

d. 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.

e. Cumulative Effects Common to Alternatives 2, 3, and 4

The proposed recreational developments in the Brush Lake area would have only minor effects upon white-tailed deer. As stated in the DEIS (p. 4-50), this proposal would not change the size of footprint or types of recreation in this area, and the presence of designated trails should serve to concentrate motorized recreation in a smaller area than is presently being utilized. 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

The following past, ongoing and reasonably foreseeable actions are considered relevant in a cumulative effects discussion for white-tailed deer:

Past Activities and Events - 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.

Other Timber Harvest - The ongoing Rock Pine timber sale will treat an additional 234 acres within the project area, all of which is above the elevational limit of critical mid-winter range. However, these treatments may result in increased forage on big game spring range by reducing overstory canopy on approximately 180 acres at the 3,200’-3,400’ elevation.

Highway 95 Realignment – In addition to those acres affected by the proposed activities, clearing the right-of-way will eliminate 160 acres of potential critical mid-winter range, 5 acres of which are currently suitable. Straightening and widening this portion of highway will also result in increased driving speeds, which may add to white-tailed deer mortality from collisions with automobiles.

Potential Future Salvage - Future salvage would not trigger incremental impacts as long as established design and mitigation measures are followed because there would be no impacts to forest structure that is relevant to white-tailed deer.

f. 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 contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

g. 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.

9) 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.

a. Alternative 1

Direct and Indirect Effects
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.

b. 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.

c. Cumulative Effects Common to All Alternatives

Past Activities and Events - Past activities (such as timber harvest) and natural processes (such as succession) are described in the Affected Environment section and provide baseline conditions for habitats.

Fire Suppression - Where active management does not occur (whether Under the No Action Alternative or in areas not proposed for treatment), 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.

d. Cumulative Effects Common to Alternatives 2, 3 and 4

Timber Stand Improvement - 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.

Future Salvage Opportunities - Future salvage would not trigger incremental impacts as long as established design and mitigation measures are followed. There would be no anticipated changes to forest structure that would affect habitat conditions for forest landbirds (see Chapter II).

e. 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).

D. Brush Lake Recreation Proposal

1) Effects Common to Alternatives 2, 3, and 4

a. T & E Species

Direct and Indirect Effects - Mission Mountain Trail #156 enhancements are the only listed proposal that would potentially have an effect upon grizzly bears or Canada lynx. Both Mission Mountain and Arndt Trail #409 are currently open to motorcycle use, but about one mile of tread leading to the junction of these trails is currently impassable to motorcycles. Reestablishing the tread on Mission Mountain Trail near this junction would not represent any paper changes in motorized route density, but on-the-ground reality would be another one-half mile of motorized route would be added to the bear use area. The currently indistinct trail in question [a portion of Mission Mountain Trail] is actually about one-half mile in length. Subsequent discussions with the District Recreation/Trails Specialist (Pat Hart, pers. comm. 2003) indicated that motorcyclists have attempted to link the two trails and, failing this, pioneered trails between the systems. Viewed in this context, reestablishing the link between the trails would confine motorized use to a smaller area and, in effect, reduce linear motorized route density in the area. Therefore, reestablishment of this tread as a motorized trail (2-wheel only) will have no effect on grizzly bears. If the trail is reconfigured to accommodate 4-wheel ATV traffic or a consistent pattern of illegal off-trail motorized use is detected, the determination of effect would have to be revisited. This trail reconstruction 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 is withdrawn from the Mission Brush proposal.

It is unlikely that trailhead improvement or trail refurbishment would result in significant increases in non-motorized trail use, and subsequently would have little effect on these species. These improvements would not result in any increase of over-snow vehicle use in the area.

The upgrades of recreation facilities in the Brush Lake area may also provide an indirect benefit for grizzly bears. Recreation would be concentrated in an area infrequently used by grizzly bears in recent years (Brush Lake).

Cumulative Effects -- Changes in the motorized accessibility to Trails #156 and #409 would be offset by the decommissioning/storing of drivable roads elsewhere in the project area, resulting in a net decrease of open motorized route density. Improvement of the Mission/Arndt system would not produce a measurable increase in motorized use, as discussed above.

All other proposed improvements are outside both the identified area of bear use and the Hall-Mission LAU.

Improvements at Brush Lake Campground would presumably ease recreational pressure within surrounding BMUs. Specifically, 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 the Dirt Oven campsite 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.

b. Sensitive and Management Indicator Species

Direct and Indirect Effects -- 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, while these upgrades would likely increase the number of visitors this area receives, the footprint of the recreation area at 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.

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. This action would merely legitimize present use patterns in an area that is ecologically better able to withstand these impacts than other parts of the District. Trail systems would not provide entry to currently inaccessible areas. Winter use of the area would not be substantially increased, so recreation would not cause undue disturbance to wintering big game. Wildlife species that rely upon riparian and wetland habitats would be protected by the restricted off-road use area. The proposed Watchable Wildlife Trail would represent a relatively small disturbance, and most users would likely stay on the trail itself.

Cumulative Effects – All together, the proposals would likely increase the number of visitors but would not change the footprint or types of recreation at the campground and would focus the motorized activities to areas that are more suitable. Restrictions to off-road activities would provide protection for riparian and wetland habitats.

4.4 RECREATION

A. Effects common to all action alternatives

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.

B. Forest Plan Consistency

All proposed activities meet Forest Plan Recreation guidelines.

C. Current and Desired Future Conditions

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.

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.

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.

Trail #156: Proposed units 66, 69, 111, and 112 border or encompass the Mission Mountain Trail. Due to the type of treatments proposed the effect to the trail would be significant. The trail currently meanders through an essentially forested environment. Treatment activities would remove most of the over story. Whether or not the trail tread is protected, 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.

Required Disclosures 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.

4.5 REQUIRED DISCLOSURES

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.

1) 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."

2) 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.

3) 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.

4) 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.

5) Heritage Resources

Disturbance of any heritage resource is an irreversible commitment; the project design criteria have been developed to avoid effects to these resources.

6) 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.

7) 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.

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.

1) 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 occur.

2) 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.

3) 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.

4) 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.

5) 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.

6) 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.

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.

1) 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.

2) 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.

3) 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.

4) 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

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.

E. Other Required Disclosures

1) 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 the most recent census (2000).

2) 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.

3) 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.

4) Effects to Floodplains and Wetlands

The Inland Native Fish Strategy (INFS) standards and guidelines implemented with this project would protect floodplains and wetlands.

5) Incomplete or Unavailable Information

Reasonably Foreseeable Activities – As stated in the Chapter 1 discussion of reasonably foreseeable actions, the Northern Prairie EA does not have a detailed project proposal at this time. Without that information, the actions cannot be analyzed in this EIS's cumulative effects discussions.

6) 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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APPENDIX A

Other Resource Concerns
Appendix A lists the resources concerns that were eliminated from detailed study. These resources were elimintaed from detailed study because the alternatives listed in Chapter 2 will either have no effect on them, or potential effects were limited and did not warrant development of another alternative.

Biodiversity

Biological Factors

Risk of Noxious Weeds
Increased travel from both timber harvest activities and recreation use can introduce and distribute the seeds of noxious weeds. Ground disturbed areas, such as landings and especially road shoulders, provide suitable habitat for many weed species. Most of the noxious weeds are very aggressive and tend to dominate over natural vegetation for use of the habitat. A weed monitoring and control program would be implemented under the KV plan if funding is available. If this becomes a priority treatment area for noxious weeds the District will seek appropriated funds. Timber sale contract provisions would be used to guarantee treatment of haul routes and landings in the project area for noxious weeds. To prevent further infestation, only certified weed free seed would be used to seed road shoulders, temporary roads, skid trails, and landings. Identified existing weed infestations within the project area would be treated according to guidelines established in the Bonners Ferry Weed Control Projects EIS (USDA 1995). Monitoring and the environmental effects of weed control are also covered in the EIS.

No significant direct, indirect, or cumulative effects from noxious weeds are expected from implementation of any alternative.

Native Plant Species
In an effort to implement ecosystem management, the Regional Office has issued direction on the use of native plant species for revegetation projects. The basic policy requires the use of native plant seed in erosion control, fire rehabilitation, riparian restoration, forage enhancement, and other vegetation projects, to the extent practicable. The purpose of this direction was to emphasize the importance of biodiversity, and to recognize the intrinsic value of native plant vegetation as a component of natural forest and rangeland ecosystems. This information is contained in a letter, dated June 8, 1993, written to the Region 1 Forest Supervisors by the Regional Forester. A copy of this letter may be found in the project file.

Wildlife
Threatened, Endangered and Sensitive Species
The following species, considered present and potentially affected by the proposed actions, are analyzed in detail: Canada lynx, grizzly bear, black-backed woodpecker, flammulated owl, northern goshawk, and fisher (see Chapter 4). Other species are presumed present, but not necessarily affected by the proposed action; they are not analyzed in detail. Supporting rationale for these species is included in the Wildlife report in Appendix B: northern gray wolf, common loon, white-headed woodpecker, Townsend's big-eared bat, wolverine, boreal toad, Coeur d'Alene salamander, northern leopard frog,.

Management Indicator Species
The following species, considered present and potentially affected by the proposed actions, are analyzed in detail in Chapter 4: pileated woodpecker, white-tailed deer, and forest land birds. The following species are presumed present, but not necessarily affected by the proposed action and were not analyzed in detail: American marten, Rocky Mountain elk, and snag habitat. Refer to Appendix B or the project file for more detailed information.

Snag Dependent Species
Habitat for snag-dependent species is discussed in detail in conjuction with black-backed woodpecker, flammulated owl, pileated woodpecker, northern goshawk, and fisher analysis in Chapter 4.

Species Not Analyzed in Detail
A few species did not require detailed discussion and analysis because the species or their habitat is presumed not be be present within the affected area. The rationale for no further analysis for the following species can be found in the Mission Brush project file: woodland caribou (T&E), bald eagle (T&E), harlequin duck (sensitive), peregrine falcon(sensitive), and nothern bog lemming (sensitive).

Habitat Linkages
Cover linkages between forested habitats allow species to travel between suitable habitats. Species differ in their ability to move between fragmented habitats. Some move freely while others will not cross even rather narrow gaps of open habitat. The proposed actions would not have a measurable effect on any linkages within or outside the project area. Consequently, no measurable direct, indirect, or cumulative effects on habitat linkages are expected.

Fish – Threatened, Endangered and Sensitive Species
Refer to Appendix B for discussions of the following species: white sturgeon, bull trout, torrent sculpin, interior redband trout, and burbot. More information is also contained in the Watershed and Fisheries project file. Detailed analysis and discussions of the following species are located in Chapter 4: westslope cutthroat trout and rainbow trout.

Range
There are no federally permitted range allotments within the analysis area. For these reasons, there would be no measurable direct, indirect, or cumulative effects on these range allotments.

Social/Economic Factors

Cultural Resources
Cultural resource surveys of the project area have been completed as directed by the Cultural Resources Management Practices (Forest Plan, Appendix FF). The cultural resource inventories are on file for selective review at the Bonners Ferry Ranger Station. Numerous sites have been recorded, and a determination made to the extent of protection required. These sites would be protected under all alternatives. Any future discovery of cultural resource sites would be inventoried and protected if found to be of cultural significance. A decision would be made to avoid, protect, or mitigate the impact to these sites in accordance with the National Historic Preservation Act of 1966. Currently, there are no known districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places that would be affected by the proposed actions. As such, the actions should not cause the loss or destruction of significant scientific, cultural, or historic resources.

Economics / Community Stability

The proposed sale is on productive forestland and could be offered with minimal investment. Estimated timber volume removed under Alternative 2 would be about 23.5 million board feet (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). Past history on the Bonners Ferry Ranger District has shown that these types of sales are often bid up to twice their advertised rate, in this case $234/MBF would not be unusual. This would be far in excess of the estimated $75/MBF it costs the district to prepare a sale. The direct and cumulative effects of each alternative would be related to the costs and revenues generated by each.

- Alternative 1 would generate no revenues and no costs.
- Alternative 2 is expected to generate a minimum of $2,700,000 in net revenues. Alternative 2 would not only generate revenues to the Federal Treasury and to USFS trust funds (KV and BD), which could be used to offset the costs of reforestation and fuels reduction, but, Alternative 2 would also provide local employment opportunities for loggers, mill workers, equipment operators (i.e., for grapple piling, fire line construction, etc.), and reforestation crews.
- Alternative 3 would generate about $2,000,000 to implement restoration treatments and provide some of the same employment opportunities as Alternative 2.
- Alternative 4 would generate about $992,000 to implement restoration treatments and provide some of the same employment opportunities as Alternative 2.

The indirect effects of each alternative would be related to future costs of maintaining healthy forested conditions in the project area. Forests that are managed within their historic range will generally be more sustainable and less costly to maintain. Under Alternative 1, the risk of severe fire would increase over time, which could lead to increased fire suppression costs, and restoration costs related to restoring ecosystem functions. Alternative 2 would reduce the risk of severe fire in both the short and long-term by trending stands toward historic conditions, which would reduce the potential suppression and restoration costs. Alternatives 3 and 4 vary in scale yet proportionally reduce the risk of severe fire in both the short and long-term by trending stands toward historic conditions, which would reduce the potential suppression and restoration costs.

Documentation of the analysis and considerations for community stability is contained in the Final Environmental Impact Statement for the IPNF Forest Plan. Given the potential employment opportunities projected under Alternatives 2, 3 and 4, it is beyond the scope of this document to assess potential impacts to community stability in great detail. However, a general assessment could be made that Alternative 2 would provide a greater number of employment opportunities, and greater diversity of employment opportunities, within Boundary County. Alternatives 3 and 4 would provide most of the same types of opportunities, but to a lesser amount than Alternative 2. Alternative 1 would provide none of the employment opportunities to help sustain community stability provided by the action alternatives.

Visual Quality

Through the scoping process it was determined that scenery management was not a significant issue that would drive alternative development. However, maintaining or improving the scenic integrity would be prudent for that portion of the project area that can be viewed from adjacent residences as well as by recreationists and other casual forest observers in the Hall Mountain, Brush Lake, and Mission Creek areas. All of these units will easily meet the Forest Plan Visual Quality Objectives or the newly adopted Scenic Integrity Objectives. The Mission Brush Visual Analysis Report is located in the project file.

Minerals

Montgomery Mine is only operation with current claim within the assessment area. None of the alternatives will change the access or have a direct indirect or cumulative effect on the mine.

Roadless Areas

There are no roadless areas within the assessment area.

Forest Plan Direction

The Forest Plan analyzed existing roadless lands (Appendix C of the Forest Plan FEIS.) and states that roadless areas will be managed based on the direction and goals established for the respective management area within which they are located (Forest Plan, p. II-4). Forest Plan Management Areas (MA) establish Forest-wide multiple use goals and standards for the Mission Brush project area as described under the Recreation subheading in Chapter 1 and Chapter 4 of the DEIS. National Forest System lands within the Hellroaring IRA were designated as Forest Plan Management Areas 1 and 9 (Forest Plan FEIS map of MAs). Chapter 1 of the DEIS describes the Management Areas (1-17 through 1-19).

Inventoried Roadless Area (IRA)

The Mission Brush project boundary does not include any Inventoried Roadless Areas (IRA). The nearest IRA is Hellroaring Roadless Area #128. The Forest Plan describes the IRA as follows:

> *Wilderness Attributes - The area's long, narrow shape hemmed in by considerable human development in the valley, logging roads, minerals exploration and development along the ridge impact the area's natural integrity and appearance. Opportunity for solitude is diminished by sights and sounds from the valley. Timber sales have encroached on the boundaries of the original inventoried roadless area.* [Since release of the Forest Plan, additional timber sales have been implemented in portions of the area.]
> *Public Interest – There is no known local, regional or national interest in wilderness designation for this area. (Forest Plan FEIS, p. III-47)*

The Hellroaring Roadless Area (HRA) has had extensive logging and road building prior to and following implementation of the Forest Plan. Consequently, the managed area has lost most of its roadless character including solitude, natural integrity, primitive recreation opportunities, wilderness manageability, apparent naturalness and unique features. Following implementation of the West Moyie EIS approximately 2,130 of the HRA remained roadless (USFS 1991). None of the action alternatives propose any treatments in the remaining portion of the HRA that still possess roadless characteristics.

Relationship of Project Activities and Unroaded Area

An *unroaded* area is defined in the Forest Service Roadless Area Conservation FEIS (USFS 2000) as, "Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with inventoried roadless area."

At the closest point, the Hellroaring IRA is about 1.7 miles east of any activities in the project area. This portion of the roadless area is a peninsula less than one mile wide between roaded areas of the forest. The

southern tip of the peninsula and most of the northwestern edge follow roads. Construction of roads in the Hellroaring drainage, through implementation of the Forest Plan as described above (West Moyie FEIS), has begun to isolate the northwestern portion from the remaining unroaded part of the IRA.

Information concerning this development can be found in the West Moyie Record of Decision page 2 (construction of roads), page 12 (description of the selected alternative) and West Moyie Final EIS pages 4-22 (discussion of effects of Alternative K on the Hellroaring Roadless Area) and 5-3 (public comments regarding the roadless area).

The unroaded area between the project area and the Hellroaring Roadless Area is generally described as an area centered in Section 18, T64N, R2E, Boise Meridian (see **A** on the map at the end of this discussion).

The analysis of effects on unroaded areas requires a description of the activities that are proposed within them, weighed against the values unroaded areas can provide or contribute to. This analysis evaluates the effects on the wilderness features considered in Forest planning (FSH 1920) and the roadless characteristics identified in the Roadless Policy (36 CFR 294.11). The following table describes the link between the wilderness features and the roadless characteristics.

Table A-1. Wilderness Features and Roadless Characteristics

Wilderness Features	Roadless Characteristics	Evaluation Criteria
Natural Integrity (the extent to which long-term ecological processes are intact and operating)	• High quality or undisturbed soil, water and air • Sources of public drinking water • Diversity of plant and animal communities • Habitat for threatened, endangered, candidate, proposed and sensitive species dependent on large areas • Reference landscapes	• Effects to ecological processes • Effects to water and air • Effects to public drinking water • Effects to species dependent on large undisturbed areas of land • Effects to reference landscapes
Apparent Naturalness (the environment looks natural to most people)	• Natural appearing landscapes with high scenic quality	• Effects to scenic quality
Remoteness (perceived condition of being secluded, inaccessible, and out of the way)	• Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation	• Effects to seclusion, remoteness • Effects to dispersed recreation opportunities
Solitude (personal, subjective value defined as the isolation from the sights, sounds and presence of others and the development of man)	• Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation	• Effects to solitude • Effects to recreation settings
Special Features (unique geological, biological, ecological and cultural or scenic features)	• Other locally identified unique characteristics	• Effects to special features
Manageability and Boundaries (ability to mange a roadless area to meet the minimum size criteria of 5,000 acres for wilderness)	• No criteria	• Effects to roadless area boundaries
Special Places (what is it about the area that causes one to visit for pleasure or their livelihood)	• Traditional cultural properties and sacred sites	• Effects on special places, including traditional cultural properties and sacred sites

A. Unroaded Area Existing Condition

The existing condition of these wilderness features and roadless characteristics are discussed in detail in the recreation report (project file) and the recreation sections of the FEIS (chapter 3). The following discussion, therefore, focuses on treatment units outside the Hellroaring Roadless Area.

a. Natural Integrity

The analysis in Chapter 4 (resource issues analyzed in detail) and Appendix A (Other Resource Concerns) describes the effects on high quality or undisturbed soil, water, and air, diversity of plant and animal communities, habitat for threatened, endangered, candidate, proposed, and sensitive species dependent on large areas. Appendix B provides a "Summary of Biological Assessments and Evaluations" threatened, endangered, candidate, proposed, and sensitive species. Complete Biological Assessments (BAs) and Biological Evaluations (BEs) are found in the project file. Information provided in these sections is applicable to the unroaded areas. Chapter 2 provides the "Design Criteria for All Action Alternatives," for protecting soil, water, and air, diversity of plant and animal communities, habitat for threatened, endangered, candidate, proposed, and sensitive species.

Effects of the alternatives on the potential for spread of noxious weeds are discussed in Appendix B Noxious Weeds (B-28 through B-37). Chapter 2 provides the "Required Design Criteria for All Action Alternatives," including noxious weeds. There are no specific effects relating to noxious weeds within unroaded areas, that differ from those described in Appendix B.

There are no sources of public drinking water in the unroaded areas within the project area, therefore, there are no direct, indirect, or cumulative effects on sources of public drinking water.

b. Apparent Naturalness

The Forest Plan (III-47) describes the HRA wilderness attributes as discussed above. This description of the HRA aptly describes the existing conditions found in Area A because these unroaded areas are also relatively narrow in shape, hemmed by considerable human development in the valley, timber harvest activity, logging roads, motorized recreation, and U.S. Highway 95. Consequently, the sights and sounds of these activities diminish the opportunity for solitude.

Alternatives 2 and 4 include approximately 67 acres of timber harvest (Unit 19 irregular shelterwood prescription) and two ecosystem burns (approximately 110 acres and 128 acres) in the unroaded area.

The irregular shelterwood harvests would create small openings of various sizes, changing the canopy closure from its current 85 percent to approximately 25 percent, thus changing the *Apparent Naturalness*. The current stand would change to irregularly shaped stands consisting of the largest diameter trees available, favoring development of white pine and western larch. The unit would be reforested with ponderosa pine, western larch and white pine (silvicultural treatment summary FEIS, chapter 2).Although stumps would be visible in the foreground, both action alternatives would be designed to meet VQOs.

The ecosystem burns are designed to restore the role of fire in the Mission Brush ecosystem, an important factor in maintaining and improving the quality and function of the dry site old growth ponderosa pine stands (FEIS Chapter 4 Old Growth discussion). These dry forest ecosystems also benefit wildlife species (FEIS, page 2-67). Such prescribed fires are implemented under strict guidelines including soil moistures,

fuel moistures, current and predicted weather (FEIS Design Criteria, Chapter 2). In the short term, it would be apparent that a ground fire had gone through the area. Old stumps and down wood, some shrubs and small trees would be scorched or burned and trunks of large trees could be scorched. However, the area would soon "greenup" as grass and forbs resprout and grow. Within one or two seasons, it would appear similar to an area that had experienced a low intensity wildfire.

Unit 19 and the Ecosystem Burns are not included in Alternative 3; thus there would be no changes under this alternative.

Tree stumps and skid trails could exclude the unroaded areas from roadless area inventory of potential wilderness until the stumps have deteriorated and skid trails have regenerated to the degree of surrounding canopy closure (FSH 1909.12, 7.11a, 9).

The unit would be reforested with ponderosa pine, western larch and white pine (silvicultural treatment summary FEIS, Chapter 2). This would not affect the apparent naturalness because tree species composition and patterns are the same as would occur naturally.

***c.* Remoteness and Solitude**

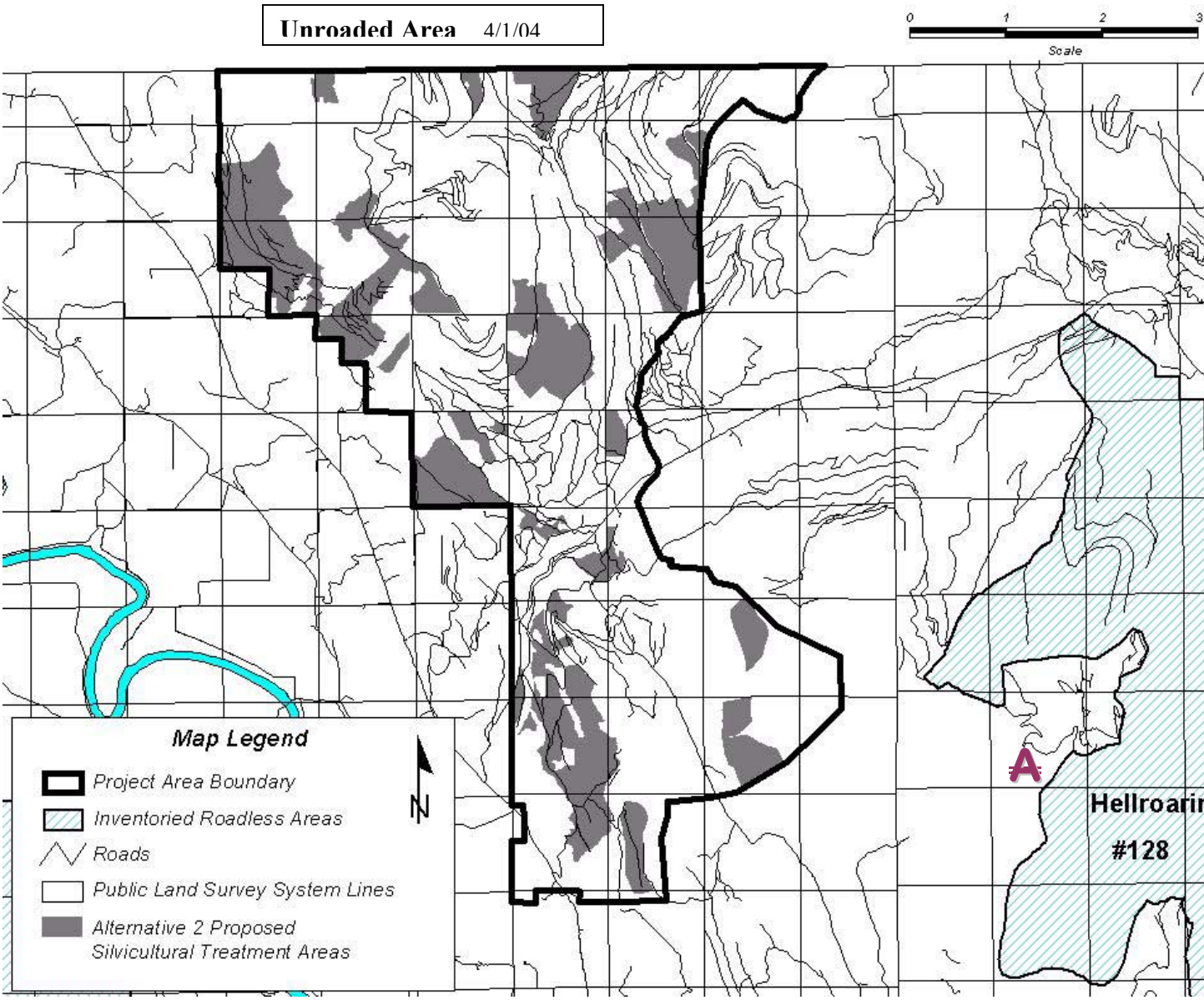
The Recreation Opportunity Spectrum (ROS) for the unroaded area is *Roaded Natural* -- generally characterized as natural settings that may have modifications that range from being easily noticeable to strongly dominant to observers in the area. Alterations and structures are unnoticed and visually subordinate from sensitive travel routes. Access via designed roads and highways is the norm. Motorized trail use is common. The density of recreational use is moderate. There are no *primitive* or *semi-primitive* recreation opportunities within these unroaded areas because these areas are characterized by essentially an unmodified natural environment of fairly large size (*primitive*), or by a predominantly natural or natural-appearing environment of moderate-to-large size (*semi-primitive)*. Additionally, motorized use is not permitted in *primitive* or *semi-primitive* areas. For all alternatives, the ROS class would remain unchanged (FEIS, Recretaion Chapter 4).

d. Special Features and Special Places

As stated in Appendix A -- Cultural Resources (FEIS, page A-2 and A-3), "Numerous sites have been recorded, and a determination made to the extent of protection required. These sites would be protected under all alternatives. Any future discovery of cultural resource sites would be inventoried and protected if found to be of cultural significance." There are no specific effects relating to cultural and heritage resources within unroaded areas that differ from those described.

e. Manageability and Boundaries

There is no proposed road construction that would change the physical character of the unroaded area. Timber harvest would change the natural character of these unroaded areas and it would take decades for stumps to detriorate and for skid trails and skyline corridors to regenerate and blend into the forested canopy. However, given the past and current level of management activities surrounding this unroaded area, the past management activities within the Hellroaring IRA, and the fact that the unroaded area is not contiguous to any wilderness area, there would be little opportunity to manage a roadless area to meet the minimum size criteria (5,000 acres) for wilderness.



Public Health and Safety

Many of the items described in Common Features, Required Design Criteria and Estimated Effectiveness for All Action Alternatives (Chapter 2), ensure consideration of public health and safety.

Effects on Minority Populations and Low-income Populations

The Kootenai Tribe of North Idaho is being consulted concerning sensitive areas that may be in the project area. No other minority other low-income populations that could potentially be impacted by any of the alternatives are located within the project area. See Chapter 2 for more information.

Water Resources and Aquatics

Microbial Contaminants

Wildlife populations and their use of the riparian areas are not expected to appreciably increase as a result of implementing any of the alternatives. The Best Management Practice (BMP) promoting appropriate disposal of human waste, the goals of reducing sediment production and delivery, and protection of the Riparian Habitat Conservation Areas (RHCAs) are all consistent with preventing delivery of microbial contaminants to the stream network. Consequently, there will be no direct, indirect, or cumulative effects from microbial contaminants

Inorganic Contaminants

Water quality can be reduced by contaminants such as salts or metals. These elements can be naturally occurring or can be delivered from roads that are treated with magnesium chloride or calcium chloride, which is used for dust abatement on forest roads.

The prescriptions for reducing stream crossing and wildfire risk, and sediment production and delivery are consistent with preventing delivery of inorganic contaminants if any natural sources are present. If the "Required Design Criteria for All Action Alternatives" are applied, then magnesium chloride or calcium chloride, which is often used for dust abatement, would not create water quality concerns. Dust abatement would not be needed under the No Action alternative. Consequently, there will be no direct, indirect, or cumulative effects from inorganic contaminants.

Organic Chemical Contaminants

Water quality can be reduced by contaminants such as industrial solvents and petroleum products. The equipment that would be used for timber harvesting, and road construction, reconstruction, and obliteration uses the largest quantities of these products and pose the greatest risk.

The "Required Design Criteria For All Action Alternatives" would reduce the risk of spilling and delivering these contaminants to the stream network to acceptable levels. Under the No Action alternative, the potential for spilling organic chemical contaminants would not change from the existing conditions, which are at a low level of risk. Consequently, there will be no direct, indirect, or cumulative effects from organic chemical contaminants.

Appendix B

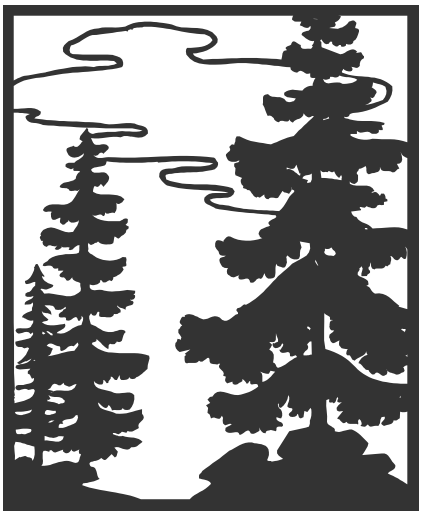
<u>Specialist Reports</u>

Wildlife

Fisheries

Sensitive Plants

Noxious Weeds



Wildlife
Summary of Effects

The following tables provide effects summaries for Threatened, Endangered, Sensitive, and MIS wildlife species. Species that may be affected (including beneficial effects) are tracked through Chapters 2, 3, and 4 of the Final EIS. Species that are not present within the project area or those that would not be affected by the proposed activities are discussed in this appendix. Formal Biological Assessments and Biological Evaluations are incorporated in the Final EIS.

Table B-1. Threatened and Endangered Wildlife Species

Common Name	Scientific Name	Species or Habitat Present in Project Area	Species or Habitat Potentially Affected	Requires a Detailed Analysis	Determination of Effects
Northern gray wolf	*Canis lupus*	Yes	No	No	No effect
Woodland caribou	*Rangifer tarandus caribou*	No	No	No	No effect
Bald eagle	*Haliaeetus leucocephalus*	No	No	No	No effect
Canada lynx	*Lynx canadensis*	Yes	Yes	Yes	May affect, not likely to adversely affect
Grizzly bear	*Ursus arctos horribilis*	Yes	Yes	Yes	May affect, not likely to adversely affect

Table B-2. Sensitive Wildlife Species

Species	No Impact	May measurably impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.	[1] Will impact individuals or habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.	Beneficial Impact
Black-backed woodpecker[2] *Picoides arcticus*		√		
Common loon *Gavia immer*	√			
Flammulated owl *Otus flammeolus*				√
Harlequin duck *Histrionicus histrionicus*	√			
Northern goshawk *Accipiter gentilis*		√		
Peregrine falcon *Falco peregrinus anatum*	√			
White-headed woodpecker *Picoides albolarvatus*				√
Fisher *Martes pennanti*		√		
Northern bog lemming	√			

Species	No Impact	May measurably impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.	[1] Will impact individuals or habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.	Beneficial Impact
Synaptomys borealis				
Townsend's big-eared bat *Corynorhinus townsendi*	√			
Wolverine *Gulo gulo*		√		
Coeur d'Alene salamander *Plethodon vandykei idahoensis*	√			
Northern leopard frog *Rana pipiens*	√			
Boreal toad *Bufo boreas*	√			

*Determinations are based on the known distribution of the species, the habitat conditions required of the species, and the current habitat conditions within the evaluation area. The rationale for the conclusion of effects is contained in the EIS document and Project File.

[1] Considered a significant action under NEPA. None of the actions in the Mission Brush project are considered to be significant.

[2] The preferred alternative would reduce the likelihood of severe fire and disease outbreaks, and thereby would reduce the possibility of an influx of high-quality black-backed woodpecker habitat, compared to the no-action alternative.

Table B-3. Management Indicator Species

Species	No Impact	May measurably impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species	Will impact individuals or habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species	Beneficial Impact
Pileated woodpecker *Dryocopus pileatus*		√		
American marten *Martes americana*		√		
Rocky Mountain elk *Cervus elaphus nelsoni*	√			
White-tailed deer *Odocoileus virginianus*		√		

Species Habitats and Requirements

This section includes a brief discussion of the species habitat preferences and requirements based on scientific literature and information from site-specific information. It also describes the environmental baseline and relevant habitat components that may or may not be affected by the alternatives if they were implemented.

Species Not Analyzed in Detail

Northern Gray Wolf

Wolves are highly social animals with large home ranges that include a variety of habitat types. While conservation requirements for wolf populations are not fully understood, a sufficient, year-round prey base (primarily ungulates) and sufficient space with minimal human exposure are considered key components of wolf habitat (USDI 1987, Tucker et al. 1990). Wolf distribution is largely influenced by distance from human activity (wolves are highly susceptible to human-caused mortality). The density and distribution of open roads provides an indicator for the level of risk to human-caused mortality.

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 and is within the region where wolves are federally listed as endangered. The project lies within the northwest Montana Recovery Area (Mack and Laudon 1998). Occasional sightings have been reported on National Forest lands. However, there have been no recent sightings (within five years) reported in the vicinity of the project. Sightings in north Idaho have mostly indicated the presence of transient individuals or lone wolves, unattached from a resident pack. There is no evidence of resident wolf packs (i.e. den sites, and rendezvous sites, reproduction success) in the area.

On the Bonners Ferry Ranger District, available prey includes white-tailed deer, elk and moose. Although no specific population numbers are available, deer and elk are common in the project area.

In fact, according to Idaho Department of Fish and Game (Compton, editor 1999) white-tailed deer and elk populations are probably at or near all-time highs.

In the absence of wildfires that created a mosaic of habitat conditions, the proposed actions would contribute to a diversified landscape, improving the quality and quantity of habitat for deer and elk. Consequently, a sufficient, year-round food source would be maintained for the occasional wolf that may visit the area.

Alternatives 2, 3, and 4 would all result in reductions in road densities. Yet, this reduction of road densities would not necessarily be the case in the Brush Lake area, since development of a system of motorized trails would, on paper, increase motorized route miles. However, as discussed in the EIS on pages 2-16 and 3-74, the old 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.

Conclusion

For these reasons and given that there have been no recent sightings or evidence of resident wolves in Boundary County, the Mission Brush project is not expected to affect wolves. No cumulative effects are expected. Therefore, no further analysis and discussion is warranted.

Common Loon

Common loons generally nest in clear, fish-bearing lakes surrounded by forest, with rocky shorelines, bays, islands, and floating bogs (McIntyre and Barr 1997). The species constructs ground nests on islands, floating bog islets, or other protected areas. Because of their need for large expanses of water for take off and landing, loons generally occur in lakes larger than 10 acres in size (USDA Forest Service 1989).

The primary threats to loons are shoreline developments and recreational activities (i.e. boating, jet skiing) that interrupt nesting. Also, on some of the larger lakes such as Priest Lake and Lake Pend Oreille, these birds are extremely sensitive to human disturbance.

Reference Condition

Anecdotal evidence suggests, at least from a historical perspective, that common loons nested in northern Idaho. In 1985 a statewide effort was conducted to document loon distribution in Idaho (Fitch and Trost 1985). Lakes investigated were chosen using guidelines on size and elevation of lakes, water depth and clarity and nest and nursery habitat requirements. During this survey, the only successful nest discovered was at Indian Lake, south of Yellowstone Park, where one chick was fledged (however, nine-tenths of this lake resides in Wyoming). While there was no direct evidence

of nesting in northern Idaho, loons were observed on several lakes including Robinson and Kerr lakes in Boundary County.

Since this study shoreline development and the amount of boating traffic have increased dramatically on most North Idaho lakes with public access.

Existing Condition

Brush Lake is the only lake within the project area where the presence of loons might be expected. However, it was not a selected site to be surveyed during the 1985 investigation. In 2001, surveys were conducted on ten lakes in northern Idaho between mid-May and mid-June to identify common loon nesting territories, including Brush Lake. No loons were observed on Brush Lake during this survey.

Brush Lake is a relatively small lake with public access and is generally inadequate with regard to protected bays and islands. Public use is primarily camping and boating. Loons are extremely sensitive to disturbance during the breeding season, and boating and other human activities on potential nesting lakes are presumably the major cause for their decline (Fitch and Trost 1985). Brush Lake is not regarded as suitable for loon nesting due to the lack of historical evidence of nesting and protected bays or islands, and escalating human use. In addition, Brush Lake is stocked annually with catchable-sized trout. There is a little spawning habitat in this lake, and although fingerlings and fry are occasionally stocked, Brush Lake generally lacks the fingerling-sized fish loons prefer as prey items.

Conclusion

Therefore, the Mission Brush project is not expected to have an impact on the common loon. No further discussion or analysis is necessary.

White-headed Woodpecker

Like the flammulated owl, the white-headed woodpecker occurs in the drier forest types dominated by pine trees in the mountains of far-western North America. Abundance appears to decrease north of California. They are generally uncommon or rare in Washington and Idaho and quite rare in British Columbia. Snags and relatively open-canopied conditions are important habitat components for both species (Idaho Partners in Flight 2000).

Modern forestry practices including clearcutting, snag removal and fire suppression have fragmented the forest and contributed to local declines of the species, particularly north of California (Garrett et al. 1996). However, this species persists in burned or cutover forests with residual snags and stumps. Therefore, populations are more tolerant of disturbance than those species associated with closed-canopy forests (Raphael et al. 1987).

Because of habitat similarities between the two species, the white-headed woodpecker is treated as a guild with flammulated owl. The project effects to this woodpecker are represented by the effects analysis for flammulated owls.

Townsend's Big-Eared Bat

Townsend's big-eared bats are primarily cave dwelling species. Although they occur in a wide variety of habitats, distribution tends to be correlated with the availability of caves, especially old mine workings (Pierson and others 1999). Their behavior appears, in most cases, to be temperature driven with bats using cooler sites before the young are born and moving to warmer sites after the young are born. In spring and summer, females form maternity colonies in warm parts of caves, mines and buildings. In winter, they prefer relatively cool places for hibernation, often near entrances and in well-ventilated parts of caves and mines (Kunz and Martin 1982).

Reference Condition

Townsend's big-eared bats occur throughout much of western North America, from British Columbia to Mexico, and eastward to Texas (Pierson and others 1999). Throughout much of their range, they are recognized as species at risk. They are currently listed as a R-1 Sensitive Species and considered species of special concern by most western states' wildlife management agencies. Records of Townsend's are found throughout the state of Idaho.

The most serious factor leading to population declines is loss and/or disturbance of suitable roosting habitat. Most notable threats include abandoned mine closures, recreational caving, and renewed mining at historical sites (Pierson and others 1999).

Existing Condition

Within the affected area of the Mission Brush project, there are two known abandoned mines (American Girl mine and Bethlehem mine complex) and one active claim (Montgomery mine complex). The American Girl mine was surveyed in 1999 and again in 2002. In 1999, six Myotis species were captured in a mist net. In 2002, while no bats were captured, night vision detected seven "visits". The Bethlehem mine complex was examined in 1998-2000 and 2002 documenting the presence of Townsend's big-eared bats along with Myotis species. The Montgomery mine complex was surveyed in 1997, documenting evidence of bat use around the entrance with no evidence of roosting.

Conclusion

Timber harvesting practices may impact both foraging and roosting habitat for bats. Impacts may range from temporary displacement to elimination of populations in those areas where alternate roost sites are unavailable. The Species Conservation Assessment and Conservation Strategy for the Townsend's Big-eared Bat (1999) suggests a 0.25 radius, "no activity" buffer be established around mines to avoid disturbance during critical periods (e.g. maternity roosts, hibernacula). Since Townsend's are known to use the area and it is inconclusive what the critical use periods are, "no-

activity" buffers would be year round (see Mitigation Measures, Chapter 2). Therefore, no further analysis and discussion is necessary.

Wolverine

Wolverines are low density, wide-ranging species found in a variety of open and forested habitats at all elevations, usually associated with remote mountain areas. They are generally described as opportunistic omnivores; traveling long distances for their daily hunting. Preferences for some forest cover types, aspects, slopes or elevations have been primarily attributed to food abundance (Ruggiero et al. 1994). An important feature of their habitat is high elevation cirque basins that provide reproductive security and year-round foraging, especially for females.

Primary risk factors that can threaten local population viability of the species include reduction of wilderness "refugia" through access and management practices that degrade the presence and opportunity for food availability (Copeland 1996). Ruggiero et al. (1994) showed through previous studies that the availability of large mammals and large mammal carrion is of paramount importance to the distribution, survival and reproductive success of wolverines. Also, the protection of reproductive denning habitat seems to be critical for the persistence of wolverine.

When viewed in conjunction with potential displacement and disturbance by winter recreational activities, denning habitat may be a limited and critical component of wolverine habitat (Copeland 1996). A recent study in Idaho found that wolverine selected den sites associated with large boulder talus in high elevation, subalpine cirque basins (Copeland 1996).

Reference Condition

Wolverines are considered scarce or rare in north Idaho, however, the actual status and range remains uncertain. The scarcity of information is largely due to the difficulty and expense in studying an animal that is solitary and secretive, and found mostly in remote areas. Occasional observations have been reported and tracks documented in recent decades.

Existing Condition

While little information exists on wolverine distribution in northern Idaho, in the fall of 2001 a wolverine was observed near Bethlehem Mountain, in the southern portion of the project area.

As is the case with other forest carnivores, wolverines require large, remote areas to roam and feed. The proposed actions are located in the developed (roaded) portion of the project area, in an environment that makes wolverine presence untenable or undesirable. While a wolverine was observed in the southern portion of the project area in 2001, this observation is located on the fringe or periphery of a large block of undeveloped ground to the east of the project area.

There are no high elevation cirque basins or potential denning habitat within the evaluation area (see project file). Consequently, the risk of disturbance and potential displacement by winter recreational activities would not be a factor. The proposed recreational developments in the Brush Lake are

would have little or no impact upon wolverines because enhanced off-road recreational opportunities would occur in a highly developed portion of the district – an unattractive area to wolverines. The undeveloped area to the east of the project area does not receive a high amount of snowmobile use – mostly along existing roads on the northern and eastern periphery – due to the high percentage of dense forest canopy. The planned enhancements in the Brush Lake area would not noticeably improve snowmobile access to this area. Snowmobile access is mainly from Hellroaring Creek to the north, as low elevation makes snow depths near Brush Lake shallow and unreliable. Subsequently, none of the features of the proposed action are likely to increase snowmobile use in the vicinity of Brush Lake or adjacent areas.

Conclusion

Access would remain unchanged, so the chance of human/wolverine interactions and subsequent mortality risk would remain the same. Ungulate populations are at or near all time highs (Compton 1999), so foraging habitat does not appear to be limiting to wolverines. Based on these factors, no impacts are expected to wolverines or their habitat. No further analysis and discussion is necessary.

Boreal Toad

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 over winter 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 may disperse up to or more than four kilometers from their natal sites (Maxell 2000). As a result of these findings, the Northern Region Regional Forester listed the boreal 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

Boreal 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.

The primary risk factor for toads is loss of breeding habitat. While there are no known records or observations of boreal toads within the Mission Brush project area, limited habitat is available in the Brush Lake area. The proposed treatment areas in the Mission Brush project do not provide breeding habitat, although toads may breed in the wetlands or meandering portions of Brush Creek, or in Brush Lake itself. Implementation of INFS and BMPs would prevent impacts to this habitat. In addition, the proposed actions are not expected to alter any non-breeding habitat used by boreal toads since this species uses a variety of upland habitat types. There will be a minor, temporary increase in road density as a result of this project, so mortality risk from vehicles may increase during project implementation. However, the end result of the proposed action will be no net increase in road density.

Conclusion

For these reasons, the Mission Brush project is not expected to impact boreal toads or their habitat. Therefore, no further analysis and discussion is warranted.

Coeur d'Alene Salamander

Coeur d'Alene salamanders are small salamanders that choose seeps and wet sites, usually with rock that contains deep fissures that enable them to moderate their temperature by avoiding outside air. Known populations occur in association with fractured rock formations often found in the Belt rock formations. They have been found in three types of select habitats: seeps and springs, waterfall spray zones, and stream edges (Groves and et al. 1996). Coeur d'Alene salamanders are usually found above ground at night during moist weather in the spring and fall and retreat into the narrow spaces between fractured rocks to avoid drying out in the summer and freezing in the winter.

Reference Condition

Coeur d'Alene salamanders are found in scattered locations through the Idaho Panhandle National Forests. This species occurs on Bonners Ferry Ranger District on the east side, but has not been recorded in the Selkirks because of inappropriate geology. Where it has been investigated, it has been found to be locally abundant but limited to appropriate microhabitats within its limited range.

Existing Condition

There are no known occurrences of Coeur d'Alene salamanders within the Mission Brush project area. Although suitable salamander habitat may be present (live stream edges and seeps/springs) within the planning area, impacts to these areas would be avoided through treatment area design and application of INFISH standards.

Conclusion

Therefore, the Mission Brush project would have no impact on the Coeur d'Alene salamander or its habitat. No further analysis and discussion is necessary.

Northern Leopard Frog

Northern leopard frogs are typically found in and adjacent to permanent slow moving water or standing water (Maxell 2000). Leopard frogs apparently require moderately high grove cover for concealment because this species attaches its eggs to aquatic vegetation. It prefers ponds or lakeshores, which have fairly dense aquatic and emergent vegetation during the spring egg-laying season. This species probably hibernates and spends it life cycle in and around ponds and lakes (Maxell 2000).

Reference Condition

Within the last twenty years, northern leopard frog populations have declined or have been extirpated from large portions of their range. Suggested causes for declines in Northern leopard frog populations include the loss of wetlands and natural hydrological regimes, the introduction of predators, the application of pesticides and herbicides, and drought. More recently, the chytrid fungus (*Batrachochytrium dnedrobatisis)* may be responsible for declines in amphibians in western United States (Maxell 2000).

Existing Condition

There are no current records for this species in Boundary County, despite surveys in 1999 specifically to investigate suitable habitat and suspected historical sites. It is known to occur just north of the Canadian border, and in the Clark Fork River, so there may be some remnant populations.

While there are no known records or observations of Northern leopard frogs within the Mission Brush project area, limited habitat is available. Based on the National Wetland Inventory maps, possible habitat is riverine or standing water and moist vegetation associated with Brush Creek and its tributaries. Both Brush Lake (a relatively warm, shallow lake) and a series of wetlands upstream of Brush Lake could be providing suitable habitat for Northern leopard frogs. However, the Inland Native Fish Strategy guidelines (INFS) and Best Management Practices (BMPs) are intended to protect the integrity of wetlands and other riparian habitat areas from sedimentation, habitat modification, changes in natural hydrological regimes and other possible impacts.

Conclusion

Because of the INFS and BMP protection measures, the proposed actions would have no impact to the Northern leopard frog or its habitat. Therefore, no further analysis and discussion is warranted.

American Marten

The marten is a solitary carnivore that inhabits mature stands of coniferous forest throughout North America. In the western United States, marten are most abundant in mature to old growth true fir or spruce-fir forests and generally avoid open, drier coniferous forests (Warren 1990). They prefer forest stands greater than 40 percent tree canopy closure, which protects them from predators and enhances the moist conditions favorable for prey species (Clark et al. 1989).

American marten was selected by the Idaho Panhandle Forest Plan as a management indicator species. It represents species using mature and old-growth habitats. In addition to a closed canopy, marten require an abundance of large downed logs and snags. These provide secure resting locations, denning habitat and winter access to small mammals living beneath the snow (Patton and Escano in Warren, 1990, pp. 29-30). American marten are easily trapped and are highly vulnerable to overharvest in areas accessible by fur trappers.

The presence of marten has not been documented in the project area. Anecdotal evidence suggests that marten are common and widespread throughout the District.

Conclusion

Because of habitat similarities with fisher, the American marten will be treated as a guild in this document with fisher. Therefore, this species will not be further analyzed in this document.

Rocky Mountain Elk

Elk are widely distributed within the Idaho Panhandle National Forests and, like deer, move seasonally in response to weather patterns and food availability. However, because of their greater foraging ability and mobility, elk will use higher elevations more than deer during the winter period. During the summer there is a general relaxation of habitat requirements and a broader use of available habitats.

Reference Condition

Early records indicate that Rocky Mountain elk occurred throughout most of Idaho. However, large herds were apparently absent from the narrow, northern portion of the State (Thomas and Toweill 1982). With the discovery of gold in Pierce, Idaho in 1860, and the subsequent settlement and exploitation, elk numbers were reduced to a few isolated herds in the State. A translocation program was initiated in 1915 and proceeded through 1946. Today, elk populations exceed their distribution and population levels of a century ago (Thomas and Toweill 1982). In fact, their numbers are regulated by harvest, and are probably near all-time highs in Idaho (Compton, editor 1999).

Beginning in the 1970s, accelerated timber harvest and associated road building have brought about mounting conflicts with elk populations. People using highly roaded areas are the single largest threat to big game populations, making them vulnerable to poaching, stress, hunting, accidents and displacement (USDA, USDI 1997). Other studies have clearly linked elk mortality rates with road

access. Leptich and Zager (1991) found consistent patterns of increased bull mortality rates with increased open road densities.

Existing Condition

Although elk populations are generally higher today than 100 years ago, high open road densities have increased elk vulnerability to hunting loss and have led to over-harvesting of some local populations. The heavy losses experienced during the winter of 1996-1997 have further stressed the importance to manage low road densities.

The Mission Brush project area lies within Game Management Unit 1. Idaho Department of Fish and Game's elk management objective for Unit 1, and other game management units, is to recover elk populations, which experienced heavy losses during the 1996-97 winter season. Since that time, recovery has been slow. According to Cole (2000), the 1999 elk rifle season had the lowest hunter success on record. Therefore, lowering road densities in the Mission Brush area would support the recovery of elk populations in Game Management Unit 1.

Because most of the bottomland in the Purcell Trench has experienced agricultural or residential development, big game winter range is somewhat limiting in the area. As a result, during unusually harsh winters there have been elk depredations of haystacks and other agricultural items on private lands west of Highway 95 in the Copeland area. With the revitalization (through burning) of seral brush fields, and the reduction of overstory cover of south- and west-facing dry-site forest stands on conventional winter range east of Highway 95, the proposed actions may partially alleviate elk damage to private lands.

Conclusion

While the proposed action may cause a temporary disturbance to resident elk, it should result in a longer-term increase in available forage on winter range. There will be no net increase of drivable roads in the project area. Therefore, the Mission Brush project is not expected to impact Rocky Mountain elk or their habitat. No further analysis and discussion is necessary.

Snag Habitat

Snags, or standing dead trees, are vital components of the forest ecosystem. In the Interior Columbia River basin they provide habitat for more than 80 species of birds, mammals, reptiles, and amphibians and play a critical function in long-term site productivity (Bull et al. 1997). Many forest-dwelling animals use these structures for nesting, foraging, denning and roosting.

Most notable users of this habitat are primary excavators, such as hairy woodpeckers and Northern flickers, which create cavities in decaying wood of standing trees. These cavities are subsequently used by other wildlife species once the primary excavators have abandoned them (Bull et al. 1997). Fallen snags or dead and down woody material have important ecological functions including nutrient cycling, nitrogen fixation, and wildlife habitat.

Historically, ecosystems in north Idaho were shaped by disturbance patterns that altered the size and distribution of forest structure across the landscape. Forest succession, wind damage, fire, insects and disease created snags in areas that ranged in size from individual trees or small patches, to entire drainages. Consequently, snag densities vary across the landscape, from areas with low densities to other areas with high densities.

Snag habitat associated with the Mission Brush project area has been strongly influenced by fire and the subsequent changes in vegetation composition. The severe fires of the 1800s left much of the landscape in early stages of forest development. A large lethal and mixed-severity fire in the 1850s probably left a lot of snags across the landscape. This change in condition likely increased, temporarily, the breeding densities of black-backed woodpeckers.

Although this stand-replacing fire provided a pulse of hard snags, it disrupted the continuity and sustainability of snag production that would occur during the predicted sequence of vegetation change. Because most snags generally do not persist long after a catastrophic fire, black-backed woodpecker populations probably dispersed from the burn areas within several years following the fire. Morrison and Raphael (1993) found that snags created by fire fell sooner than non-fire-created snags. Burning at their base probably weakens snags created by fire. Also, snags in large burned areas are directly exposed to wind, causing them to fall sooner than snags surrounded by live trees. In addition, subsequent large-scale fires likely consumed most of the remaining snags on the landscape.

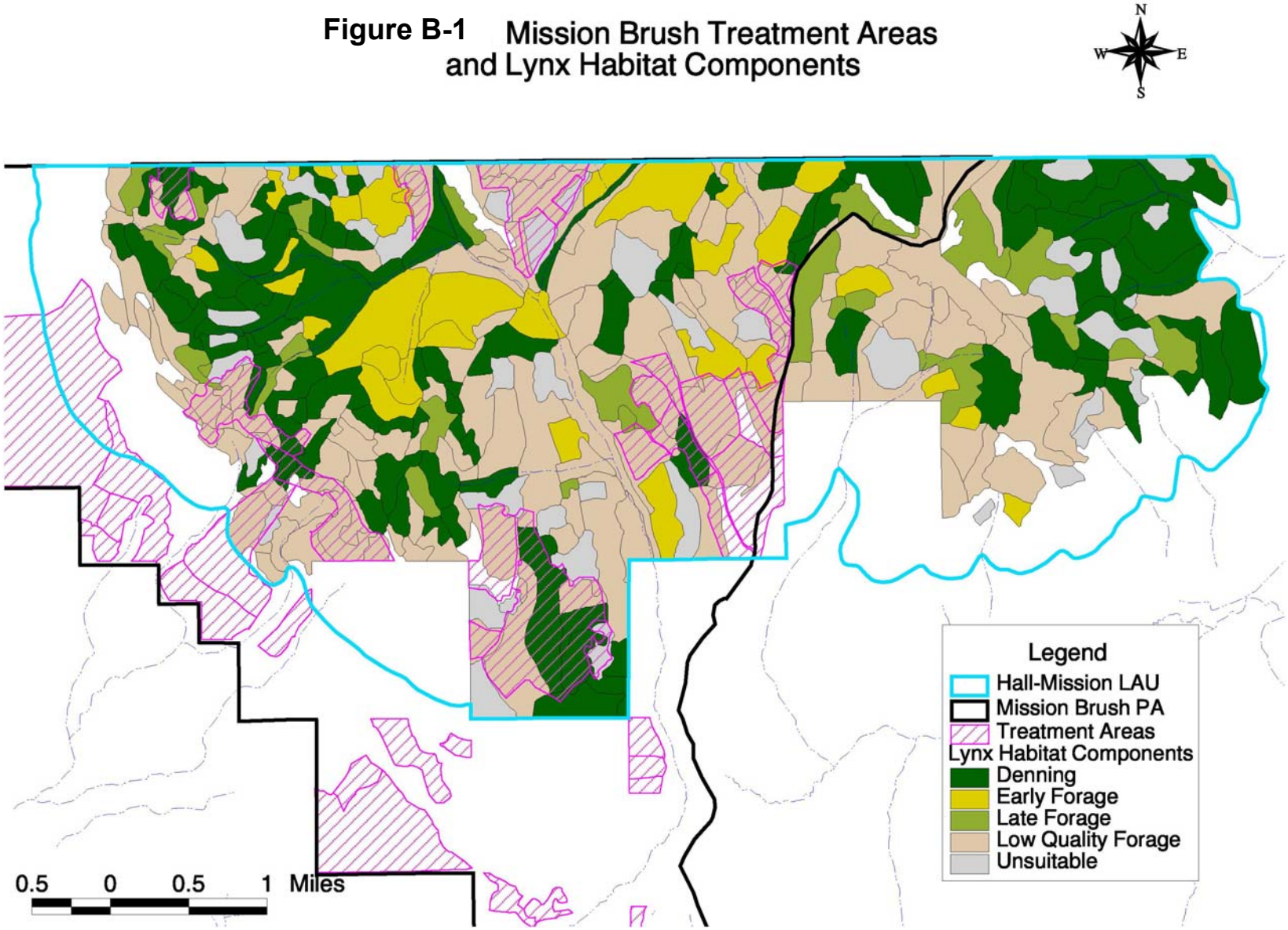
Design features of the project were devised to ensure the retention and selection of snags at a level and distribution to support viable populations of species that use snags and logs. Snags and snag replacements would be retained in all treatment units at levels recommended by the Region 1 Snag Management Protocol. The Snag Protocol recognizes that not all stands are able to meet snag guidelines, but that the overall goal is to provide adequate snag habitat over the landscape. Snag retention objectives exceed Forest Plans standards and snag retention levels developed by Thomas et al. (1979).

Documentation of Effects

Potential effects to snag habitat are addressed in detail Chapter 4 analysis of effects upon snag-dependent species (black-backed woodpecker, pileated woodpecker, flammulated owl, northern goshawk and fisher).

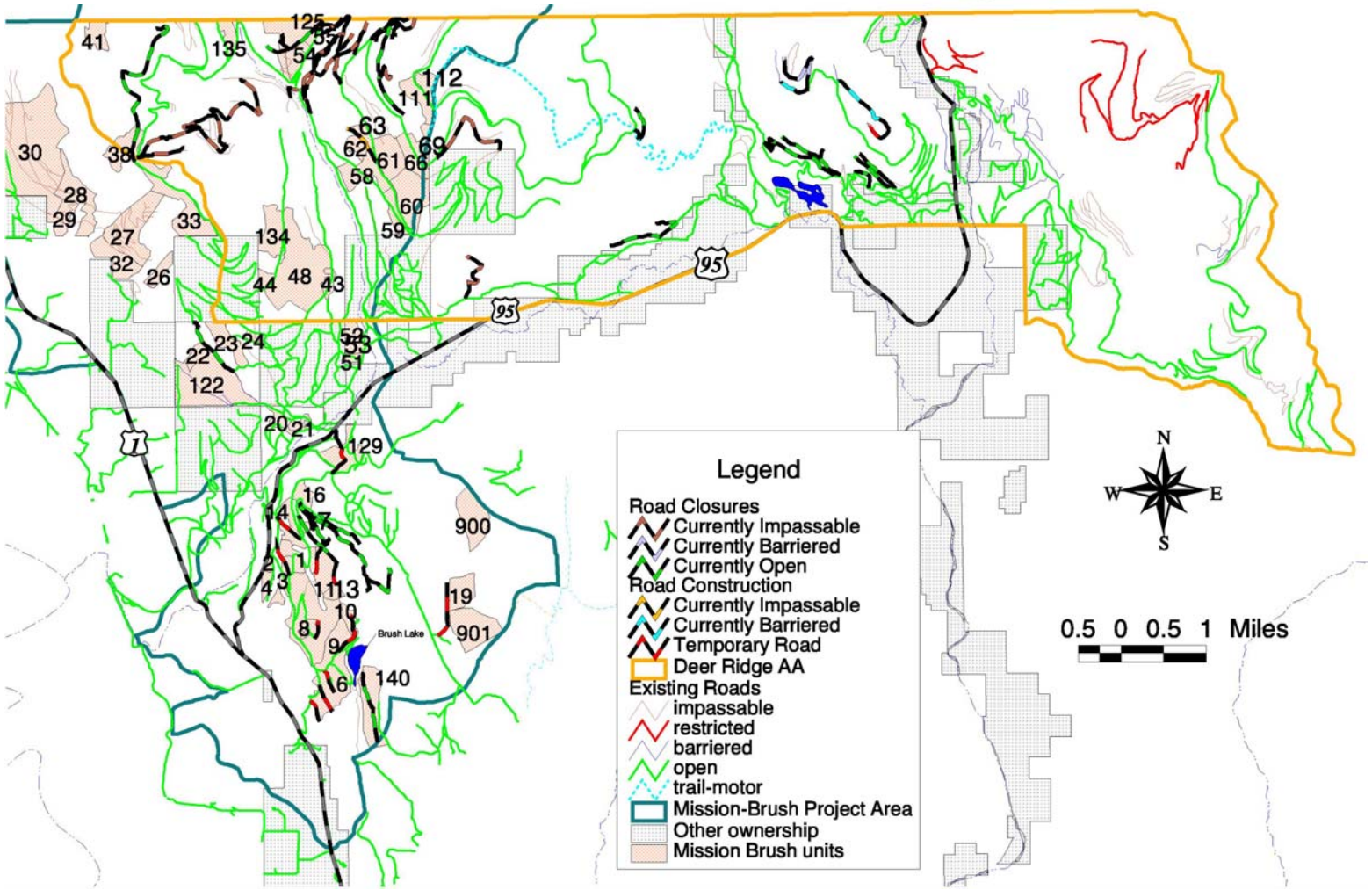
This map displays the habitat components within the Canada lynx analysis cumulative effects area for the Mission Brush EIS.

Figure B-1 Mission Brush Treatment Areas and Lynx Habitat Components



This map displays proposed treatment units and road management for the Mission Brush project as well as the Deer Ridge Analysis Area for grizzly bear.

Figure B-2 Mission Brush Treatment Units, Road Treatments & the Deer Ridge AA



Fish - Threatened Endangered and Sensitive Species

Determination of Effects
The following discussions and tables summarize the effects on federally listed and sensitive 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.

Westslope Cutthroat Trout

Cutthroat trout have been identified in Mission Creek, both above and below the falls. West slope cutthroat trout were stocked in Brush Lake in the 1990s and 2002 by Idaho Department of Fish and Game. Further information can be found in Chapters 3, 4 and the project file.

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 not found outside the mainstem Kootenai River, which is outside the cumulative effects area for this project.

Table B-3 Determination of Effects

Federally listed species:

Species	Species or Habitat Present in Project Area	Species or Habitat Potentially Affected	Species Further Analyzed	Determination of Effects
Endangered:				
White sturgeon *Acipenser transmontanus*	No	No	No	No effect
Threatened:				
Bull trout *Salvelinus confluentus*	No	No	No	No effect

Sensitive Species:

Species	No Effect	May Impact Individuals, but Will Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species	Likely to Impact Individuals or Habitat with a Consequence that the Action May Contribute Towards Federal Listing or Reduced Viability for the Population or Species**	Benefi cial Effect
Burbot *Lota lota*	X			
Interior redband trout *Oncorhynchus mykiss gairdneri*	X			
Westslope cutthroat trout *Oncorhynchus clarki lewisi*		X		
Torrent sculpin *Cottus rhotheus*		X		

**Considered a trigger for a significant action. (None of the proposed actions are considered significant actions)

Threatened, Endangered and Sensitive Plant Species

Regulatory Framework

Federal legislation, regulations, policy and direction require protection of species and population viability, evaluation and planning process consideration of Threatened, Endangered and other rare (Forest Service Sensitive) plant species. The regulatory framework for TES plants includes direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants (WWFRP) program and Washington Office as well as the following items:

- Endangered Species Act (1973) as amended;
- National Forest Management Act (1976);
- National Environmental Policy Act (1969);
- Forest Service Manual (2672.1-2672.43);
- Idaho Panhandle National Forests (IPNF) Forest Plan (1987).

Summary of Threatened, Endangered and Sensitive Plants

There are no Threatened or Endangered plant species suspected to occur in the project area.

Surveys for sensitive plants were conducted in 1997 and 2002. Occurrences of Mingan moonwort (*Botrychium minganense*), triangle moonwort (*B. lanceolatum*) and black snakeroot (*Sanicula marilandica*) (a Forest Species of Concern) were found near some proposed harvest units. The occurrences would be protected by project design (see Chapter 2 – Required Design Criteria for All Action Alternatives).

It was determined that implementation of any action alternative may directly impact undetected individuals of sensitive moonwort species, but that such impacts would not result in a trend toward federal listing or a loss of population or species viability. There would be no impact to other moist forest sensitive species not found in the project area. No suitable aquatic, peatland, deciduous riparian or dry forest habitat would be impacted under any action alternative.

Alternatives 2 and 3 would directly impact 39 acres of moderately suitable moist forest habitat, 5 acres of suitable cold forest/subalpine forest habitat and no suitable wet forest habitat. No moderately suitable moist forest, cold forest/subalpine or wet forest habitat would be impacted under Alternative 4.

Impacts to suitable sensitive plant habitat under any action alternative would not be expected to lead to a long-term loss of habitat capability. Cumulative impacts to sensitive moonworts and suitable moist forest habitat for moonworts would be low to moderate under all action alternatives. See the project file for a list of sensitive plant species, field survey results, and a detailed report.

Affected Environment

Methodology

Analysis of the current condition of rare plants and suitable habitat was accomplished using Idaho Conservation Data Center (ICDC) Element Occurrence Records, results of floristic and rare plant surveys, National Wetlands Inventory maps, timber stand examination records, aerial photographs, topographical maps, and professional judgment of the North Zone Botanist. Queries of the Timber Stand Management Record System (TSMRS) were used to provide a "coarse filter" assessment of suitable rare plant habitat in the watershed.

Field surveys of suitable habitat identified by TSMRS often reveal the extent of suitable habitat to be far less than that predicted by the queries. Conversely, specialized habitats and microsites of suitable habitat are usually underrepresented in coarse filter queries. Pre-field review was conducted in 1997.

Threatened and Endangered Plants

There are no federally listed Threatened or Endangered plant species suspected to occur in the project area.

A Threatened species, as determined by the US Fish and Wildlife Service, is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Currently, the US Fish and Wildlife Service (USDI 2002) indicates three species listed as Threatened for the Idaho Panhandle National Forests (IPNF).

Water howellia (*Howellia aquatilis*) - No occurrences of water howellia are documented in the Kootenai River sub basin. Potentially suitable habitat occurs in the southern portion of the project area, in small ponds north of Brush Lake. Riparian Habitat Conservation Areas established for all wetlands in the project area would protect any suitable habitat for the species.

Ute ladies'-tresses - No suitable habitat was identified in or near the project area. Streams in the project area support vegetation of the coniferous forest zone. All known populations of Ute ladies'-tresses generally occur below the coniferous forest vegetation zone, only occasionally occurring at or near low timberline in the transition between coniferous forest and nonforest or woodland vegetation (Moseley 1999). While the absolute elevation of known populations varies from 1,800 to 7,000 feet, the species occurs at low elevations relative to the surrounding landscape (Moseley 1999).

Spalding's catchfly - A Forest-wide habitat analysis for was conducted using Satellite Imagery Landtype Classification (SILC). This serves as an approximation of habitat occurrence and distribution and can be used as a coarse filter for habitat suitability. Further review such as aerial photograph interpretation and field verification, is necessary to determine the true extent of suitable habitat for Spalding's catchfly. The area was determined to have low potential to support Spalding's catchfly.

Sensitive Plant Species and Forest Species of Concern

Sensitive species are determined by the Regional Forester as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers or habitat capability which would reduce the species' existing distribution. The Northern Regional Forester's sensitive species list for the IPNF contains 63 plant species. Certain species are known to occur only within certain subbasins, while others are known throughout the IPNF. Fifty-six species are known or suspected to occur in the Kaniksu portion of the IPNF, which encompasses the Mission Brush project area.

In addition, several "Forest species of concern" are addressed in this analysis. A Forest species of concern is generally not at risk on a rangewide, region-wide or state level, but may be imperiled within a planning area, such as a National Forest. These species are addressed in effects analysis to provide for maintenance of populations. A discussion of Forest species of concern is included with the discussion of sensitive species. A list of sensitive species and Forest species of concern is included in the Project File.

Slender moonwort (*Botrychium lineare*). - On June 6, 2001, USFWS issued a petition finding that slender moonwort was warranted for listing as Threatened or Endangered but precluded by other higher priority actions (USDI 2001). The species has been added to the USFWS candidate species list. One historical occurrence of slender moonwort is documented from Upper Priest River but has not been seen since 1925. However, because of concerns for the species' viability range-wide, it is addressed in this document as a Forest species of concern.

Rare Plant Guilds

Sensitive plant species and Forest species of concern may be assigned to one or more rare plant guilds. These guilds are artificial assemblages based on similar habitat requirements of two or more rare plant species, and are used for analysis. Rare plant guilds in which most IPNF sensitive plant species occur include the following: aquatic, deciduous riparian, peatland, wet forest, moist forest, dry forest, cold forest and subalpine. Within these guilds, microsites such as small rock seeps and springs can support certain sensitive plants; these microsites are not identifiable at a coarse scale. Larger rock cliffs are often visible on aerial photographs, or can be inferred from topographical maps. A list of habitat guild descriptions is included in the project file with the sensitive species list.

The predicted extent of highly suitable rare plant habitat proposed for activities in shown in the table below. The determination was based on vegetation information in the National Wetland Inventory data and District databases (TSMRS) and is subject to field verification. The project file contains stand-by-stand habitat guild data from which the table below was derived.

Pre-field review results

The Forest species of concern **slender moonwort** (*Botrychium lineare*) has never been documented in numerous surveys on the Bonners Ferry Ranger District. Only one historical occurrence of this rare, primitive fern is documented in the IPNF. Threats to slender moonwort include habitat succession as a result of fire suppression, livestock grazing, exotic species, development, timber

harvest, roads and recreation (Rey-Vizgirdas 2000). No harvest activities are proposed in highly suitable habitat for this species.

Table B-5. Suitable habitat for TES plants and Forest Species of Concern by habitat guild.

Habitat Guild	Total Acres Project Area	Alt 2 acres	Alt 3 acres	Alt 4 acres
Aquatic	94	0	0	0
Peatland	0	0	0	0
Deciduous Riparian	0	0	0	0
Wet Forest	30	0	0	0
Dry Forest	1,529	587	488	587
Moist Forest	1,960	148	148	63
Cold Forest	450	51	51	0
Subalpine	452	132	132	0
No Guild	8,441	1,747	1,327	1,151
Limited data*	1,456	797	797	672
CYPFAS**	2,224	765	401	765

* Stands that lacked sufficient information to assign a habitat guild. All such stands associated with the action alternatives were surveyed.

** CYPFAS = *Cypripedium fasciculatum*, a USFS Region 1 sensitive species currently not known to occur north of the Coeur d'Alene River Ranger District. This species was not found in the project area during rare plant surveys. However, habitats similar to those that support the species in its known range occur in the project area. This species is not currently listed for the Kaniksu portion of the IPNF and will not be discussed further.

Field Survey Results

Rare plant surveys were performed in the 1990s in many proposed harvest units for previous timber sales, including Mission Possible, 96 Tiers, Along Hall, Helitier, Uproaring Salvage, Can Haul, Along Haul Salvage, and Rock Bottom. Rare plant surveys were performed for the Mission Brush project in August of 1997. Following review of the Regional Forester's 1999 sensitive species list, it was determined that surveys for rare mosses and lichens should be conducted. Those surveys were accomplished in October of 2002.

Intensive surveys targeted highly suitable habitat within or adjacent to proposed harvest units. Cursory surveys were conducted in other proposed units to assess the potential for sensitive plant occurrence and to identify small microsites that could support sensitive plant species. Complete results of field surveys are included in the project file.

The actual extent of **subalpine** and **cold forest** habitat in proposed harvest units was found during field surveys to be fewer than five acres combined. Moderately suitable **moist forest** habitat occurs in only one proposed harvest unit under Alternatives 2 and 3 (approximately 39 acres as determined during field surveys). The remainder of moist forest habitat surveyed was found to have low to marginal potential to support rare plants.

No suitable **wet forest habitat** habitat is proposed for harvest under any action alternative.

One **dry forest** species, **least bladdery milkvetch** (*Astragalus microcystis*), occurs about 45 miles south of the project area above Lake Pend Oreille. This species is generally restricted to rock outcrops and gravel banks above large streams and rivers (ICDC 2002). Dry forest habitat identified by project-specific queries was found to lack suitable microsites to support least bladdery milkvetch.

Populations of **Mingan moonwort** (*Botrychium minganense*), **triangle moonwort** (*B. lanceolatum*) and **black snakeroot** (*Sanicula marilandica*) occur in the project area. Two occurrences of Mingan moonwort and one occurrence each of triangle moonwort and black snakeroot were identified adjacent to some proposed harvest units, near proposed unit boundaries.

Environmental Consequences

Methodology

Analysis was conducted using results of rare plant surveys, current distribution and condition of rare plant species in habitats similar to those found in the proposed treatment sites, current knowledge of the ecology of rare species known or suspected within the project area, and professional judgment.

The issue indicator for analysis of effects to moist forest moonworts is the relative amount of canopy opening and/or ground disturbance in and adjacent to documented moonwort occurrences and/or suitable habitat. The issue indicator was determined based on the affinity of moist forest moonworts for relatively closed-canopy conditions (ICDC 2002) and their dependence on soil mycorrhizae[1], which may be destroyed during ground-disturbing activities.

The issue indicator for analysis of effects to black snakeroot is the amount of ground disturbance in documented occurrences of the species. Personal observations of this species in north Idaho indicate that populations respond to canopy opening by increased flowering, and that ground disturbance provides for expansion of populations, so long as the populations themselves remain viable.

The cumulative effects area for TES plants is the project area. This area represents the likely limit of effects to rare plant populations from implementation of the action alternatives. Those limits are largely based on the expected distance of spore or seed dispersal and potential for colonization of rare plant populations in areas of suitable habitat. While patterns of dispersal are not known with certainty for many plant species, in studies of *Botrychium virginianum* most spores fell within three

[1] Mycorrhizae are symbiotic relationships between fungi and the roots of certain plant species. Although their ecology is poorly understood, it is apparent that mycorrhizal relationships enhance uptake of nutrients by the host plant (Allen 1991).

meters of the source plant (Peck et al. 1990). Other sensitive species' seeds that are heavier than *Botrychium* spores might be assumed to have similar if not more restricted dispersal patterns.

Cumulative effects to rare plant species and suitable habitat from proposed activities are generally described with the following definitions:

very low no measurable effect on individuals, populations or habitat
low individuals, populations and/or habitat not likely affected
moderate individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level which could support sensitive plant species
high populations would likely be affected and/or habitat capability may over the long term be reduced below a level which could support sensitive plant species

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

Past Activities and Events
- Large scale wildfire
- Timber harvest on National Forest lands
- Road construction
- Timber harvest on private lands

Current and Ongoing Activities
- Helispot maintenance
- Road maintenance
- Trail maintenance
- US Highway 95 Realignment

Reasonably Foreseeable Actions pertinent to TES plants:
- Other restoration projects - noxious weeds monitoring and treatment, native seeding and timber stand improvement (tree thinning and pruning in plantations), dock replacement at Brush Lake.
- Bonners Ferry Salvage Sales EA
- Timber harvest on private lands
- Rock Pine, Hare Brush and other Timber Sales (Rock Bottom EA)
- Underburning in dry site old growth stands
- (See Chapter 2 for a complete listing of Reasonably Foreseeable Activities)

Effects Common to All Action Alternatives

All rare plant occurrences would be buffered from harvest activities under all action alternatives. A qualified botanist would assist with unit layout to ensure adequate buffering of documented rare plant occurrences.

Threatened Species

Water howellia (*Howellia aquatilis*): No occurrences of this species are documented in the Kootenai River sub basin. Riparian Habitat Conservation Areas established for all wetlands in the

project area would protect any suitable habitat for the species. **No direct, indirect or cumulative effects** would be expected to occur.

Ute ladies'-tresses (*Spiranthes diluvialis*): Habitat suitability for this species within the project area is considered low. **No direct, indirect or cumulative effects** to Ute ladies'-tresses or any suitable habitat would occur. The USFWS TES plant list #1-9-04-SP-219 signed 4/14/04 has removed Ute ladies'-tresses (*Spiranthes diluvialis*) from the list of threatened species.

Spalding's catchfly (*Silene spaldingii*): Potential for occurrence of this species in the project area was determined to be low. Implementation of either action alternative would have **no direct, indirect or cumulative effects** on the species.

Sensitive Species and Forest Species of Concern

Table B-6. Sensitive Plant Species Summary of Conclusion of Effects**

Species	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Toward Federal Listing Or Loss Of Viability To The Population Or Species	Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Toward Federal Listing Or Cause A Loss Of Viability To The Population Or Species*	Beneficial Impact
Aquatic species	X			
Deciduous Riparian species	X			
Moist Forest species		X		
Wet Forest species	X			
Dry Forest species	X			
Peatland species	X			
Subalpine species		X		
Cold Forest species		X		

Comments: Rationale is contained within this discussion; a detailed sensitive plants report is located in the Project File. Note that the determination for effects to Moist Forest, Cold Forest and Subalpine species, other than *Botrychium* species, refers to impact on suitable habitat for species of those guilds. As disclosed, no other sensitive species were found in the project area.

* Considered a trigger for a significant action in NEPA (None of the proposed actions are considered significant.)
** Note: The rationale for the conclusion of effects is contained in this Appendix.

Proposed Activities

No currently documented populations of any sensitive plant species or Forest species of concern would be directly or indirectly impacted by implementation of any action alternative. Vegetation treatment unit boundaries would be adjusted to exclude any documented occurrences from harvest activities (see Chapter 2, Required Design Criteria for All Action Alternatives).

There is no **deciduous riparian forest** in the project area. No harvest or project-related activities are proposed in **aquatic habitat** in the project area. Based on the location of proposed activities, INFS riparian buffers, and professional judgment, no aquatic habitat able to support any sensitive plant species would be impacted by implementation of any of the action alternatives; there would be no direct or indirect impacts to any sensitive species or habitats in these guilds.

The documented **moonwort** occurrences and their habitat in the project area would be buffered from all harvest activities (see Chapter 2 - Required Design Criteria for All Action Alternatives); no direct impacts would be expected to these occurrences. The buffers would also preserve critical soil mycorrhizae. However, sensitive moonworts occupy a broader habitat range than most other sensitive species; several moonwort species have been found in disturbed meadows and on roadsides. They are often difficult to see because of their small stature, and aboveground stalks do not appear every year.

Individuals that go undetected during floristic surveys may be impacted by harvest activities. Undetected individuals of these species in marginal habitat could be impacted under all action alternatives. Based on past monitoring (Penny 1995), moonwort populations are generally represented by at least some aboveground plants every year. Because negative survey results reduce the risk of populations going undetected, and because moonworts appear adapted to a broad range of habitats, loss of undetected individuals is considered incidental, such impacts would not lead to a trend to federal listing or a loss of population or species viability.

Site-specific surveys would be conducted as needed before implementation of any road decommissioning and appropriate mitigation prescribed as described in Chapter 2. Removal of culverts at stream crossings may directly impact a small amount of suitable rare plant habitat, and undetected individuals of sensitive moonworts may be directly impacted, with no trend to federal listing or loss of population or species viability expected to occur.

Based on current knowledge of the species' distribution, impacts to the Forest species of concern **slender moonwort** (*Botrychium lineare*) would not be expected to occur from implementation of either action alternative. Although occcurrences of sensitive moonworts have been identified in numerous surveys on Sandpoint Ranger District, slender moonwort has never been documented.

There would be no impact to **black snakeroot** (*Sanicula marilandica*) from implementation of any of the action alternatives. The documented occurrence of this species would be protected by project design (see Chapter 2 – Required Design Criteria for All Action Alternatives).

There would be no impact to any other **moist forest species** not found in the project area. No impacts to suitable **wet forest guild** habitat would occur, since no such habitat is proposed for any activities.

Rock cliff microsites in the **dry forest guild**, which are potential habitat for least bladdery milkvetch (*Astragalus microcystis*), would not be impacted by harvest activities. No direct, indirect or cumulative impacts to species or habitat of this guild would occur.

Past Activities and Events

Large-scale wildfires and road construction on National Forest and private lands in the project area have likely affected rare plants and/or rare plant habitat through ground disturbance, canopy removal and/or the introduction of exotic plant species.

Timber harvest on National Forest lands may have impacted sensitive plant populations. However, timber harvest activities occurring since 1991 have provided for identification and protection of sensitive plant populations.

Timber harvest on private lands very likely had adverse impacts to sensitive plants and/or suitable sensitive plant habitat, since there are no requirements to provide for sensitive plant population or species viability on privately owned lands.

Current and Ongoing Activities

Road and helispot maintenance would occur in areas with low suitability as rare plant habitat. No effects to rare plants would be expected to occur from these activities.

US Highway 95 Realignment – sensitive plant surveys were conducted for that project, with no sensitive plants found on National Forest lands in the Right-of-Way.

Reasonably Foreseeable Activities

Weed treatment and monitoring **-** would follow guidelines established in the Bonners Ferry Noxious Weeds Control Project EIS (USDA 1995). No effects to rare plants beyond those described in that EIS are expected to occur.

Pre-commercial thinning - would occur in areas with low potential to support rare plants. Other than possible incidental effects to undetected individual moonworts, no impacts to rare plants would be expected to occur.

Tree planting – would occur in areas with low potential to support rare plants. Other than possible incidental effects to undetected individual moonworts, no impacts to rare plants would be expected to occur.

Boat dock replacement at Brush Lake – no sensitive plants or Forest species of concern are documented in Brush Lake. No impacts would be expected to occur.

Bonners Ferry Salvage Sales EA - several stands in the project area are proposed for potential future salvage harvest. Any stands with documented sensitive plant occurrences were dropped from consideration for potential future salvage harvest under the Bonners Ferry Salvage Sales EA. Sensitive plant surveys must be conducted in any stands that have the potential to support rare plant species prior to implementation of harvest activities under the EA.

Timber Harvest and Related Activities on Private Lands – Planned activities on private lands in the project area include grapple piling, burning and planting on lands owned by Forest Capital. The

activities would occur in recently harvested areas that likely impacted sensitive plants and/or suitable sensitive plant habitat. Implementation of these activities may also impact sensitive plants.

Rock Pine / Harebrush Timber Sales (and other sales from Rock Bottom EA) – sensitive plant surveys were conducted for that project, with documented occurrences of sensitive moonworts buffered from all harvest activities.

Underburning in Dry Site Old Growth Stands – this activity would occur in habitat with low potential to support any sensitive plant species or Forest species of concern. No impacts would be expected to occur.

Potential Effects

Alternative 1 - No Action

Management activities would not change from current levels, and current trends, including increased fuel loading and cycles of tree mortality from root disease and insects would be expected to continue. No impacts to TES plants would occur.

Effects Common to Alternatives 2 and 3

Under these action alternatives, regeneration harvest in approximately 39 acres of moderately suitable moist forest habitat in Unit 135 may impact undetected individuals of rare **moonwort** populations and temporarily reduce habitat capability. Habitat capability would be expected to recover over the long term. This determination is based on the persistence of some moist forest moonworts in habitats that have experienced regeneration harvest, site preparation and burning (ICDC 2002), and on the evidence of past ground and crown fires in moist forest moonwort populations (USDA 1998a). Unit 135 burned in the 1740s and again in the 1920s.

Impacts to **subalpine** and **cold forest guild** habitat would be negligible, since only about 5 acres of this habitat guild actually occur in proposed harvest units under these alternatives.

Alternative 2

Temporary road construction under this alternative would occur mostly in areas with low potential for sensitive plants. No documented occurrences of sensitive plants or Forest species of concern would be impacted. Incidental impacts to sensitive moonwort individuals may occur, but would not be expected to reduce population or species viability or lead to a trend to Federal listing.

There impacts would be the same as those described above under Effects Common to All Action Alternatives and Effects Common to Alternatives 2 and 3.

Alternative 3

With the elimination of road construction, some units proposed under Alternative 2 would not be treated under this alternative; however, none of the units contain suitable rare plant habitat, so there would be no difference in effects with regard to sensitive plants.

There impacts would be the same as those described above under Effects Common to All Action Alternatives and Effects Common to Alternatives 2 and 3.

Alternative 4

Under this alternative, several of the units proposed under Alternatives 2 and 3 would not be treated. As a result, fewer acres of marginally suitable habitat and no moderately suitable habitat for sensitive moonworts would be treated. In addition, no suitable cold forest or subalpine forest habitat would be impacted under this alternative.

Summary of Cumulative Effects

Based on the above analysis, cumulative impacts to **sensitive moist forest moonworts** under any action alternative would be low (individuals, populations and/or habitat not likely affected) to moderate (individuals and/or habitat may be affected, but populations would not be affected. Over the long-term, habitat capability would not be reduced below a level that could support the species.

Cumulative impacts to **black snakeroot** would not be expected to occur under any action alternative.

Cumulative impacts to other sensitive **moist forest** species not found in the project area would be very low.

Consistency with the Forest Plan and National Forest Management Act (NFMA)

A Forest Plan management goal is to "manage habitat to maintain populations of identified sensitive species of animals and plants" (USDA 1987, 2-1). A Forest Plan standard for sensitive species is to "manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to Federal listing under the Endangered Species Act" (USDA 1987, 2-28). The Forest Plan also identifies the need to "determine the status and distribution of Threatened, Endangered and Rare (sensitive) plants on the IPNF" (USDA 1987, 2-18).

All alternatives would meet Forest Plan direction, as well as NFMA requirements for maintaining population and species viability.

Habitat Guild Descriptions

Detailed descriptions of the following guilds and species known to occur within the guilds are included in the project file:

Subalpine Guild: Includes certain plant communities found at high elevation sites, generally above about 5,000 feet, mostly on ridges, subalpine parklands (subalpine grass and sedge communities), exposed rock outcrops and certain harsh, high elevation communities

Cold Forest Guild: Includes the more productive and mesic phases of subalpine fir/menziesia and subalpine fir/beargrass community types, mostly above 4,800 feet; however, they can occur below 4,800 feet in cold, north-facing drainages. This includes cold riparian areas that can extend well below 4,000 feet and are dominated by cold and wet subalpine fir/bluejoint reedgrass and subalpine fir/twisted stalk communities. These cold riparian communities can also contain a mosaic of peatland communities and species, and a few rare species generally found in warmer western hemlock communities, such as *Streptopus streptopoides* (krushea).

Wet Forest Guild: This guild is found in wet, generally riparian, often mid- to late-successional western redcedar and wet western hemlock plant communities, including most identified 'ancient cedar groves' found scattered throughout the northern subbasins, generally at less than 4,000 feet. Certain plant communities within these systems, including cedar/devil's club, cedar/ladyfern, cedar/maidenhair fern, western hemlock/oakfern, and cedar/oakfern have a high potential to support rare plants. Many species within this guild are rare coastal disjuncts. Other rare species are boreal disjuncts or boreal peripherals. Certain scattered rare species occur in these communities on riparian benches or other shallow-sloped microsites. Wet forest communities can also contain, or intergrade into, peatland communities such that Peatland Guild species and Wet Forest Guild species can overlap across the landscape. Some of the Wet Forest Guild species can also be found in Moist Forest Guild habitats.

Moist Forest Guild: This guild is found in moist western redcedar and western hemlock communities, generally in mid- to late-successional stages below 4,800 feet. A few species can also be found in moist grand fir/queencup beadlily communities. Certain members of the Wet Forest Guild can also be found in these more mesic upland plant communities. Some rare species occur in small, moist microsites within these mesic communities. Some rare and uncommon plant species are found in moist forest habitats, and shallow-sloped microsites. The boreal species *Lycopodium dendroideum* (ground pine) can also occur in these more mesic communities.

Dry Forest Guild: This guild encompasses dry, open sites in ponderosa pine, Douglas-fir / ninebark, Douglas-fir / pinegrass – kinnikinnick, and Douglas-fir / Idaho fescue or Douglas-fir / bluebunch wheatgrass communities, generally below 4,500 feet.

Deciduous Riparian: Broad-leaved deciduous forests occur on islands and margins of lowland major rivers in the Kaniksu zone such as the Kootenai River. These forests are most commonly dominated by black cottonwood, with lesser amounts of introduced plains cottonwood and escaped hybrid poplars which were planted for stream bank stability. Cottonwood communities are often are adjacent to shrub-carr communities and can form an indistinguishable mosaic. Stands of quaking aspen are also present and associated with higher gradient streams or moist seeps. Quaking aspen, paper birch and water birch also occur as secondary components in lowland conifer-dominated forests throughout northern Idaho. Red alder is an uncommon but sometimes locally abundant coastal disjunct.

Aquatic Guild: This guild occurs generally in shallow, shoreline zones (less than 2 meters) of springtime pools, small ponds and lakes throughout northern Idaho, generally at lower elevations. Floating-leaved pondweed, water-milfoil, bladderworts, and other species occur alone or in combination in shallow shoreline zones. Yellow pond lily and water-shield are frequently present as

monocultures in deeper shoreline zones. Large-leaved pondweed, white- stalked pondweed, and Richardson's pondweed are common in deeper zones (greater than 2 meters) of many northern Idaho lakes.

Peatland Guild: Peatlands are habitats whose soil substrate is composed of organic material, where deposition of organic material exceeds decomposition. In north Idaho, peatland habitats are found mostly in the northern three subbasins (Priest, Kootenai and Pend Oreille). This guild can be divided into five distinct sub-guilds, each containing different plant communities and species, substrates, pH and abiotic processes:

poor fen
intermediate/rich fen
ombrotrophic bog
paludified forest
shrub carr

Noxious Weeds

The impacts of noxious weed invasions on forest resources and the effectiveness and impacts of different weed treatment methods are discussed in the Bonners Ferry Noxious Weed Control Projects Environmental Impact Statement (USDA 1995), hereby incorporated by reference.

Information on current weed infestations and weed treatment in the project area is derived from a status report submitted by the district weed technician (Bergstrand 2003). A copy of the report is in the project file. Copies of treatment records for Forest roads in the project area are also included in the project file.

Affected Environment

Current Weed Infestations

Noxious and undesirable weeds are currently infesting several sites in the project area. The following weeds have been observed primarily along roads (both open and closed) in the project area:

Absinthe wormwood (*Artemesia absinthe*)
spotted knapweed (*Centaurea maculosa*)
Canada thistle (*Cirsium arvense*)
sulfur cinquefoil (*Potentilla recta*)
bull thistle (*Cirsium vulgare*)
meadow hawkweed (*Hieraceum pratense*)
goatweed (*Hypericum perforatum*)
common tansy (*Tanacetum vulgare*)
oxeye daisy (*Leucanthemum vulgare*)

The heaviest infestations occur on roads in intermingled ownership (FS road 2217 and lower portion of FS 272) and on closed spur roads in the lower portion of Mission Creek. In some areas, meadow hawkweed, thistles, and spotted knapweed have spread off the road prism.

While weed infestations in the lower portion of Mission Creek are heavy, the upper portion on the drainage and the Hall Mountain area are considered relatively weed free.

Weed infestations are also much lower in the Brush Lake area (FS road 1004, FS road 2485 and FS road 397); following several years of monitoring and treatment, weed populations on FS 1004 in particular have been reduced to "almost negligible levels" (see project file).

The project file contains a map showing heavily infested, and relatively weed free areas within the project area. Under all action alternatives, cleaning of all off-road equipment would be required before moving from heavily infested to relatively weed-free areas.

Past, Current and Planned Treatments

Because of the high level of weed infestations on FS roads 2217 and 272 and their spurs, and because of a lack of coordination in weed treatment with private and private industry owners, these roads are a lower priority for treatment. Treatments in the last several years have focused on preventing weed spread along the open roads in the lower portion of Mission Creek. Future weed treatment in this area will be conducted with the same focus.

Weed treatments in the upper portion of Mission Creek and in the Hall Mountain and Brush Lake areas have been more successful at substantially reducing weed infestations from prior levels. Treatment needs have decreased over the years on roads in this portion of the project area (see project file). Priorities for continued monitoring and spot treatment in this area will continue to focus on campground roads and open roads to high use sites, with other roads treated as funding allows.

Effects Analysis

Methodology

Analysis was conducted using results of past noxious weed surveys, current distribution of weed species in habitats similar to those found in the proposed treatment sites, and types of proposed treatments. The estimation of risk of weed spread and introduction of new weed invaders from the proposed activity is based on peer-reviewed literature, experience in the project area and on similar sites in the IPNF, and professional judgment.

Effects of proposed actions on noxious weed spread are based on the difference between alternatives in the amount of canopy removal, and predicted amount of soil and/or understory vegetation disturbance.

Analysis of effects to noxious weeds from various activities relies on the following assumptions:

- Where harvest would be ground-based, there would be more ground disturbance than with helicopter logging. Therefore, the risk of weed spread would be higher than where helicopter logging would occur.

- Selective timber harvest would remove approximately 30 percent of the tree canopy, allowing for increased understory vegetation growth, including some noxious weed species. The effects of commercial thinning would be similar to those of selective harvest.
- Regeneration treatments remove a significant portion of the canopy (greater than 70 percent), and would treat fuels with site preparation. This type of harvest and fuels treatment carries a greater risk of weed spread than selective harvest or commercial thinning, particularly when in proximity to existing infestations.
- Even in the absence of soil or vegetation disturbance, some weed species may invade if tree canopy cover is significantly reduced.

Direct and Indirect Effects

Alternative 1 – No Action

Under the No Action alternative, there would be no change in the risk or rate of weed spread, since management practices would not change from current conditions. Treatment of existing weed infestations and monitoring for new invaders would be dependent on District priorities and the availability of appropriated funding.

Since no road decommissioning would occur, it is doubtful that existing weed infestations on old, undriveable roads would be treated. Untreated weeds would provide a continued seed source for further expansion in the project area.

All other effects from the No Action Alternative are discussed below under Effects Common to All Alternatives.

Alternative 2

There would be a risk of weed spread associated with temporary road construction, timber harvest activities and a proposed wildlife burn. The proposed wildlife burn would occur in the portion of the project area that is considered to be relatively weed-free.

The risk of weed spread in susceptible habitat proposed for underburning would vary for different plant communities. Those dry areas where shrub species are predicted to dominate would be at lower risk, while dry grass and forb-dominated communities would be at higher risk for weed invasion. With monitoring and treatment as proposed in Chapter 2, the risk of new invaders spreading to the area of the wildlife burn would be low. The risk of existing infestations expanding into the burned area would be reduced but not eliminated.

Based on past monitoring (see project file), preventive seeding and monitoring would greatly reduce the risk of new invaders becoming established in the project area. Following decommissioning of temporary roads and preventive seeding, the risk of weed spread would decrease over time as desired species become established. For desired vegetation to become established, the decommissioned roads would be monitored and treated as needed (see Chapter 2 – Noxious Weed Measures).

All other effects from the Modified Proposed Action are discussed below under Effects Common to All Alternatives and Effects common to All Action Alternatives.

Alternative 3

Because there would be no new road construction under this alternative, there would be slightly less risk of weed spread than under Alternative 2. There would also be less timber harvest and fuels treatment and no wildlife burn under this alternative, resulting in less soil and understory vegetation disturbance, and less risk of weed spread.

All other effects from the No New Roads Alternative are discussed below under Effects Common to All Alternatives and Effects common to All Action Alternatives.

Alternative 4

Because fewer acres would be treated under this alternative, there would be less ground or canopy disturbance from timber harvest and fuels treatment and a lower risk of weed spread than under Alternative 2 or 3.

However, as under Alternative 2, there would be a risk of weed spread from road construction and a proposed wildlife burn. The proposed wildlife burn would occur in the portion of the project area that is considered to be relatively weed-free.

As under Alternative 2, the risk of weed spread in susceptible habitat proposed for underburning would vary for different plant communities. Those dry areas where shrub species are predicted to dominate would be at lower risk, while dry grass and forb-dominated communities would be at higher risk for weed invasion. With monitoring and treatment as proposed in Chapter 2, the risk of new invaders spreading to the area of the wildlife burn would be low. The risk of existing infestations expanding into the burned area would be reduced but not eliminated.

With monitoring and treatment as proposed in Chapter 2, the risk of new invaders spreading to the area of the wildlife burn would be low. The risk of existing infestations expanding into the burned area would be reduced but not eliminated.

All other effects from the Wildlife Alternative are discussed below under Effects Common to All Alternatives and Effects common to All Action Alternatives.

Direct and Indirect Effects Common to All Action Alternatives

There is a risk of weed spread from ground disturbing harvest activities, particularly along skid trails and in regeneration harvest units. Preventive seeding of native and desired non-native species would reduce, but not eliminate, the risk of weed spread. Treatment of weeds along haul routes would greatly reduce the risk of weed spread.

Contract requirements to clean off-road harvest equipment prior to entry into the sale area would further reduce the risk of weed spread. The risk of introduction and establishment of new weed

invaders to the project area is expected to be low with implementation of the above measures (see Chapter 2, Noxious Weed Measures). The requirement for cleaning of off-road equipment before moving from weed-infested to relatively weed-free portions of the project area would further reduce the risk of weed spread.

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

There would be no measurable increase in the risk of weed spread from tree planting. Only a small amount of soil disturbance would occur with clearing of planting spots. As the planted trees grew, the canopy would eventually close to shade out many weed species.

There would be a temporary increase in risk of weed spread following road decommissioning. Pre-treatment of existing infestations and preventive seeding would reduce the risk of further spread over time to current levels. In addition, newly decommissioned roads would be monitored over a three-year period to detect new weed invaders and to assess the success of preventive measures. Without the recurring disturbance of road maintenance and use, and with increasing canopy coverage of desired species, risk of weed spread would decline to below the level for open or gated roads.

Goatweed and spotted knapweed may increase, at least temporarily, in some areas following harvest and fuels treatment activities. After a fall burn in western Montana in Douglas-fir/ninebark habitat dominated by shrubs, spotted knapweed was not present in the first post-fire year, but its volume doubled two years following the burn compared with pre-burn volume (Noste 1982) . After a spring burn of lesser intensity on an adjacent site, no spotted knapweed was recorded before or after burning. Shrubs recovered faster and grasses increased on the spring burn, while herbaceous cover recovered faster and non-graminoid herbaceous species increased in the fall burn (Noste 1982).

Goatweed may also increase on burned sites. Weed prevention and treatment measures would reduce but not eliminate the potential for spread of goatweed and knapweed into previously uninfested areas.

Direct and Indirect Effects Common to All Alternatives

With implementation of any alternative, seeds from any weeds on Forest roads in the project area may still be transported within and out of the area by vehicles, people, birds, and wildlife. There is still a high potential for weed spread on roads in mixed ownership from untreated infestations on private and private industry lands. In these areas of mixed ownership, the main Forest roads would likely need continual treatment at some level to prevent further spread of weeds along the road prism.

It is likely that treatment of at least some Forest Roads in the project area would continue as needed to protect the investments made in previous years, with priority given to roads in the project area that are considered to be relatively weed-free. Treatment needs are expected to decrease over time as species that are more desirable establish along those roads.

Based on past monitoring (see project file), successful weed treatment would remove the majority of new seed source on National Forest roads, which occurs in greater concentrations on roadsides, and would slow the rate of spread of most weed species within the project area. In addition, maintenance treatment levels are generally less intensive once weed infestations have been substantially reduced (Bergstrand personal communication).

Cumulative Effects

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

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

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

very low = no measurable effect on existing weed infestations or susceptible habitat
low = existing weed infestations and/or susceptible habitat not likely affected
moderate = existing weed infestations or susceptible habitat affected, with the potential for expansion into uninfested areas and/or establishment of new invaders
high = weed infestations and/or susceptible habitat affected, with a high likelihood of expansion into uninfested areas and/or establishment of new invaders.

<u>Past Activities and Events</u>
- Large scale wildfire
- Timber harvest on National Forest lands
- Road construction
- Timber harvest on private lands

<u>Current and Ongoing Activities</u>
- Helispot maintenance
- Road maintenance
- Trail maintenance
- US Highway 95 Realignment

<u>Reasonably Foreseeable Actions</u>
- Other restoration projects - noxious weeds monitoring and treatment, native seeding and timber stand improvement (tree thinning and pruning in plantations), dock replacement at Brush Lake.
- Bonners Ferry Salvage Sales EA
- Timber harvest on private lands
- Rock Pine Timber Sale (and other sales from the Rock Bottom EA)
- Underburning in dry site old growth stands

Cumulative Effects Common to All Alternatives

Under all alternatives, cumulative effects with regard to new invaders are expected to be low. Under Alternative 1, because there is a high likelihood that weed management efforts would continue to protect investments already made, and because no new disturbance would occur, no new invaders are expected to become established. Under Alternatives 2, 3 and 4, because of features designed to detect and eradicate new invaders, no new invaders are expected to become established.

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

Past Activities and Events

Past large-scale wildfires, timber harvest and road construction provided areas of disturbance of soil, vegetation and canopy cover for invasion by non-native plant species, including noxious weeds. Because of inadequate past weed prevention and control practices, the effects of these activities, particularly in areas of mixed ownership, on noxious weed spread are still evident. However, recent monitoring shows that current weed control efforts have greatly reduced infestations on National Forest lands in the project area (see project file).

The loss of canopy cover from past activities and events is considered irretrievable but not irreversible. As tree canopy closes weeds that are shade-intolerant will, over the long term, be displaced by shade-tolerant species. This process could take 20-30 years or more.

Current and Ongoing Activities

Helispot maintenance would include noxious weeds monitoring and treatment activities. The risk of weed spread from this activity would be mitigated by weed treatment and preventive seeding practices.

Road maintenance activities may result in ground disturbance that would be conducive to new weed invaders becoming established, and to the spread of existing weed populations. Preventive seeding with desired species and regular monitoring for weeds would reduce but would not eliminate this risk.

Trail maintenance activities generally result in low levels of ground disturbance and present a low risk of weed spread.

Reasonably Foreseeable Actions

Noxious Weed Treatment And Monitoring – These activities would follow guidelines established in the Bonners Ferry Noxious Weeds Control Project EIS (USDA 1995). The risk of new invaders becoming established would be low. Mitigation measures to reduce the risk of weed spread as a result of project activities would protect recent investments in weed management on Forest Roads in the project area. The impacts of noxious weed invasions on existing weed infestations and the

effectiveness and impacts of different weed treatment methods are discussed in the Bonners Ferry Noxious Weed Control Project Environmental Impact Statement (USDA 1995), which is incorporated by reference.

Weed treatment activities would be successful in controlling goatweed and spotted knapweed along road prisms, but in the short-term would not have a significant effect on these species where they occur away from Forest roads. These two species are considered naturalized in the project area, and would not be eradicated by weed treatment efforts.

The short-term management goal for goatweed and spotted knapweed is to reduce the risk of seed and plant parts being transported out of the project area. The long-term goal is to reduce the size of infestations and slow the rate of spread within the project area. Based on past monitoring (see project file), treatment of existing infestations on haul routes with approved herbicides, and preventive seeding and monitoring on skid trails, would greatly reduce the risk of transporting these species off-site.

Should funding allow, biological control agents for knapweed and goatweed may be released in off-road infestations and would over time reduce the incidence of those species. Treatment of most other weed species, which are mostly confined to road prisms, would be moderately to highly effective in reducing their spread within the project area.

Meadow hawkweed infestations along open road prisms and on closed roads to be decommissioned or put into storage would be treated. However, off-road infestations – particularly those on private and private industry lands – would continue to provide a seed source. Consequently, there would be a risk of reinfestation of treated roads in areas of intermingled ownership. Meadow hawkweed is not likely to be eradicated from the project area without a cooperative effort among all landowners in the project area (Bergstrand personal communication).

Successful native seeding in disturbed areas, in conjunction with monitoring and weed treatment as proposed, would provide for revegetation of desired species and would reduce the available ecological niche for weeds to occupy. One study has shown that competition from desired species - especially grasses - reduces spotted knapweed survival, biomass and reproduction (Steinger and Muller-Scharer 1992).

Timber stand improvement projects (precommercial thinning and pruning) would not result in sufficient ground disturbance or tree canopy removal to affect weed spread.

Dock replacement at Brush Lake would have a low risk of introducing weeds to the lake, with the requirement to clean off-road equipment proposed in Chapter 2.

Bonners Ferry Salvage EA – implementation of activities under this EA would include the same design criteria to reduce the risk of weed spread as those proposed in Chapter 2 of this EIS.

Timber harvest and related activities on private lands would pose a moderate to high risk of weed spread within those lands and a moderate to high risk of reinfestation in adjacent National Forest lands, as long as infestations on private lands remain untreated.

US Highway 95 Realignment would pose a risk of weed spread from ground disturbance; however, design features to mitigate that risk, including revegetation with desired species, would reduce that risk.

Rock Pine / Harebrush Timber Sales (Rock Bottom EA) – implementation of this project would pose a risk of weed spread; however, contract requirements to clean off-road equipment would reduce that risk.

Underburning in dry site old growth stands – there would be a risk of weed spread from this activity. The risk of weed spread would depend on the proximity of weed infestations to the stands that would be burned, the time of year and intensity of the burns, and the understory composition of the stands to be burned. As stated above, stands with a higher brush component are more resistant to weed establishment than stands dominated by an understory of grass and forb species.

Cumulative Effects Common to Alternatives 2, 3 and 4

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

Short-term cumulative effects regarding susceptibility to weeds would be associated with ground disturbing activities proposed in the action alternatives. Proposed mitigation (see Chapter 2 – Noxious Weed Measures) would reduce but not eliminate the risk.

Over the long term, the loss of canopy cover from implementing the proposed activities is considered irretrievable but not irreversible. As tree canopy closes, susceptibility of areas proposed for harvest and/or underburning would decrease. However, this process could take 20-30 years or more.

For spotted knapweed, some evidence suggests that as succession proceeds and nutrients become less available, the competitive advantage shifts from spotted knapweed to native plants such as bluebunch wheatgrass (Krueger et al. 2001).

There is a risk of weed spread from harvest activities, particularly along skid trails and in regeneration harvest units. There would be a risk of weed spread associated with road reconstruction. Preventive seeding and monitoring as proposed would reduce, but not eliminate, the risk of weed spread. Following recontour of roads and preventive seeding, the risk of weed spread would decrease over time to its present level.

Preventive seeding of native and desired non-native species on all areas disturbed during harvest activities would reduce, but not eliminate, the risk of spread. Proposed treatment of weeds along haul routes prior to ground-disturbing activities would greatly reduce the risk of weed spread (see Chapter 2, Noxious Weed Measures). Proposed contract requirements to wash off-road harvest equipment prior to entry onto National Forest lands would further reduce the risk of weed spread (see Chapter 2, Noxious Weed Measures).

Additional measures designed to reduce the risk of spread from heavily infested areas to relatively weed-free areas are described in Chapter 2, Noxious Weed Measures.

Forest Plan Consistency

According to the Idaho Panhandle Forest Plan (1987) direction, infestations of many noxious weed species, including knapweed, goatweed and common tansy, are so widespread that control would require major programs that are not possible within expected budget levels (Forest Plan, p. II-7). Forest Plan direction is to "provide moderate control actions to prevent new weed species from becoming established". The No Action alternative meets Forest Plan direction by not creating disturbance conducive to new noxious weed invasions or spread of existing weed populations. Alternatives 2, 3 and 4 provide moderate control actions through project design, as required by the Forest Plan, to prevent new weed species from becoming established.

It should be noted that, since the Forest Plan was implemented in 1987, the issue of weed infestations on National Forest lands has evolved to encompass broader issues of native ecosystem integrity and the effects to non-commodity resources and ecosystem processes. Appropriated and Knutsen-Vandenberg funding levels for noxious weeds programs in the IPNF have increased dramatically since the mid-1990s, and the trend is toward sustaining or increasing those funding levels (see the project file). The Forest Plan revision process will consider the increased emphasis on weed management.

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APPENDIX C

Site Specific Best Management Practices

Introduction

The Forest Service is required by law to comply with water quality standards developed under authority of the Clean Water Act. The Environmental Protection Agency and the States of Idaho are responsible for enforcement of these standards. The Idaho Panhandle National Forest Plan states (Chapter II, p. 27) that the Forest will "maintain high quality water to protect fisheries habitat, water based recreation, public water supplies and be within state water quality standards". The use of BMPs is also required in the Memorandum of Understanding between the Forest Service and the State of Idaho as part of our responsibility as the Designated Water Quality Management Agency on National Forest System lands. The State's water quality standards regulate nonpoint source pollution from timber management and road construction activities through application of Best Management Practices (BMPs). The BMPs were developed under authority of the Clean Water Act to ensure that Idaho's waters do not contain pollutants in concentrations, which adversely affect water quality or impair a designated use. State recognized BMPs that will be used during project design and implementation are contained in these documents:

1) Rules and Regulations Pertaining to the Idaho Forest Practices Act, (IFPA), as adopted by the Idaho Land Board; and
2) Rules and Regulations and Minimum Standards for Stream Channel Alterations, as adopted by the Idaho Water Resources Board under authority of the Idaho Stream Channel Protection Act (ISCPA).

Many of the rules and regulations for stream channel alterations are contained, in slightly different forms, in two Memorandum of Understandings (MOU) between the USFS and the State of Idaho. These MOUs are incorporated into the Forest Manual and R-1 Supplement 31, contains provisions which are not currently state recognized BMPs.

The practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet state and Forest water quality objectives. The purpose of this appendix is to: 1) establish the connection between the Soil and Water Conservation Practice (SWCP) employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAPA 16.01.2300.05) and 2) identify how the SWCP Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code. The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also covered.

The objective of this appendix is to provide conservation practices for use on National Forest Lands to minimize the effects of management activities on soil and water resources. The conservation practices were compiled from Forest Service manuals, handbooks, contract and permit provisions, to directly or indirectly improve water quality, reduce losses in soil productivity and erosion, and abate or mitigate management effects, while meeting other resource goals and objectives. They are

of three basic forms: administrative, preventive and corrective. These practices are neither detailed prescriptions nor solutions for specific problems. They are purposely broad. These practices are action initiating process mechanisms, which call for the development of requirements and considerations to be addressed prior to and during the formulation of alternatives for land management actions. They serve as checkpoints, which are considered in formulating a plan, a program and/or a project.

Although some environmental impacts may be characteristic of a management activity, the actual effects on soil and water resources will vary considerably. The extent of these management effects on soil and water resources is a function of:

1) The physical, meteorological and hydrologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, soil type, vegetative cover, etc.).
2) The type of activity imposed on a given environment (recreation, mineral exploration, timber management, etc.) and its extent and magnitude.
3) The method of application and the duration of the activity (grazing system used, types of silvicultural practice used, constant vs. seasonal use, recurrent application or onetime application, etc.).
4) The season of the year that the activity occurs or is applied.

These factors vary within the National Forests in the Northern Region and from site to site. It follows then that the extent and kind of impacts are variable, as are the abatement and mitigation measures. No solution prescription, method, or technique is best for all circumstances. Thus the management practices presented in the following include such phrases as "according to the design", "as prescribed," "suitable for," "within acceptable limits," and similar qualifiers. The actual prescriptions, specifications, and designs are the result of evaluation and development by professional personnel through interdisciplinary involvement in the NEPA process. This results in specific conservation practices that are tailored to meet site specific resource requirements and needs.

BMP Implementation Process

In cooperation with the States, the USDA Forest Service's primary strategy for the control of nonpoint sources is based on the implementation of BMP's determined necessary for the protection of the identified beneficial uses. The Forest Service Nonpoint Source Management System consists of:

1) BMP selection and design based on site-specific conditions; technical, economic and institutional feasibility; and the designated beneficial uses of the streams.
2) BMP Application
3) BMP monitoring to ensure that they are being implemented and are effective in protecting designated beneficial uses.
4) Evaluation of BMP monitoring results.
5) Feeding back the results into current/future activities and BMP design.

The District Ranger is responsible for insuring that this BMP feedback loop is implemented on all projects. The Practices described herein are tiered to the practices in the R1/R4 FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet State and Forest water quality objectives. The purpose of this appendix document is to: 1) establish the connection between the SWCP employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAHO APT 16.01.2300.05) and 2) identify how the SWCP, Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code (BMP's). The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also included.

Format of the BMPs

Each Soil and Water Conservation Practice (SWCP) is described as follows:

Title: Includes the sequential number of the SWCP and a brief title.

Objective: Describes the SWCP objective(s) and the desired results for protecting water quality.

Effectiveness: Provides a qualitative assessment of expected effectiveness that the implemented BMP will have on preventing or reducing impacts on water quality. The SWCP effectiveness rating is based on: 1) literature and research (must be applicable to area 2) administrative studies (local or within similar ecosystem); and 3) professional experience (judgment of an expert by education and/or experience). The expected effectiveness of the SWCP is rated either High, Moderate or Low.

High: Practice is highly effective (>90%) and one or more of the following types of documentation are available:

a) Literature/Research - must be applicable to area
b) Administrative studies - local or within similar ecosystem
c) Experience - judgment of an expert by education and/or experience.
d) Fact - obvious by reasoned (logical response).

Moderate: Documentation shows that the practice is effective less than 90% of the time, but at least 75% of the time.

Or

Logic indicates that this practice is highly effective, but there is little or no documentation to back it up.

Or

Implementation and effectiveness of this practice will be monitored and the practice will be modified if necessary to achieve the objective of the BMP.

Low: Effectiveness unknown or unverified, and there is little to no documentation
Or
Applied logic is uncertain in this case, or the practice is estimated to be less than 75% effective.
Or
This practice is speculative and needs both effectiveness and validation monitoring.

The effectiveness estimates given here are general, given the range of conditions throughout the Forest. More specific estimates are made at the project level when the BMPs are actually prescribed.

Compliance: Provides a qualitative assessment of how the implementation of the specific measures will meet the Forest Practice Act Roles and Regulations pertaining to water quality.

Implementation: This section identifies: (1) the site-specific water quality protection measures to be implemented and (2) how the practices are expected to be applied and incorporated into the Timber Sale Contract.

Items Common To All Soil And Water Conservation Practices

Responsibility for Implementation: The District Ranger (through the Presale Forester) is responsible for insuring the factors identified in the following SWCPs are incorporated into: Timber Sale Contracts through the inclusion of proper B and/or C provisions; or Public Works Contracts through the inclusion of specific contract clauses.

The Contracting Officer, through his/her official representative (Sale Administrator and/or Engineering Representatives for timber sale contracts; and Contracting Officers Representative for public works contracts) is responsible for insuring that the provisions are properly administered on the ground.

Monitoring: Implementation and effectiveness of water quality mitigation measures are also monitored annually. This includes routine monitoring by timber sale administrators, road construction inspectors, and resource specialists which is documented in diaries and project files. Basically, water quality monitoring is a review of BMP implementation and a visual evaluation BMP effectiveness. Any necessary corrective action is taken immediately. Such action may include modification of the BMP, modification of the project, termination of the project, or modification of the state water quality standards.

Abbreviations

TSC = Timber Sale Contract
TSA = Timber Sale Administrator
PWC = Public Works Contract
SCA = Stream Channel Alteration Act
BMP = Best Management Practices
SPS = Special Project Specifications
CFR = Code of Federal Regulations
SAM = Sale Area Map
COR = Contracting Officer Representative
IFPA = Idaho Forest Practices Act
SWCP= Soil and Water Conservation Practices
SMZ = Streamside Management Zone
EPA = Environmental Protection Zone

Key Soil And Water Conservation Practices

Class * Soil and Water Conservation Practice (FSH 2509.22)

11 WATERSHED MANAGEMENT

W 11.07 Oil and Hazardous Substance Spill Contingency Planning
W 11.09 Management by Closure to Use
W 11.11 Petroleum Storage & Delivery Facilities & Mgt

13 VEGETATION MANIPULATION

G 13.02 Slope Limitations for Tractor Operation
G 13.03 Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
E 13.04 Revegetation of Surface Disturbed Areas
E 13.05 Soil Protection During and After Slash Windrowing
E 13.06 Soil Moisture Limitations for Tractor Operation

14 TIMBER

A 14.02 Timber Harvest Unit Design
A 14.03 Use of Sale Area Maps for Designating Soil and Water Protection Needs
A 14.04 Limiting the Operating Period of Timber Sale Activities
E 14.05 Protection of Unstable Areas
A 14.06 Riparian Area Designation
G 14.07 Determining Tractor Loggable Ground
E 14.08 Tractor Skidding Design
E 14.09 Suspended Log Yarding in Timber Harvesting
A 14.10 Log Landing Location and Design
E 14.11 Log Landing Erosion Prevention and Control
E 14.12 Erosion Prevention and Control Measures During Timber Sale Operations
E 14.13 Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities
E 14.14 Revegetation of Areas Disturbed by Harvest Activities
E 14.15 Erosion Control on Skid Trails
E 14.16 Meadow Protection During Timber Harvesting
S 14.17 Streamcourse Protection (Implementation and Enforcement
E 14.18 Erosion Control Structure Maintenance
A 14.19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
E 14.20 Slash Treatment in Sensitive Areas
A 14.22 Modification of the Timber Sale Contract

15 ROADS AND TRAILS

A 15.02 General Guidelines for Road Location/Design
E 15.03 Road and Trail Erosion Control Plan
E 15.04 Timing of Construction Activities
E 15.05 Slope Stabilization and Prevention of Mass Failures
E 15.06 Mitigation of Surface Erosion and Stabilization of Slopes
E 15.07 Control of Permanent Road Drainage
E 15.08 Pioneer Road Construction
E 15.09 Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects
E 15.10 Control of Road Construction Excavation & Sidecast Material
S 15.11 Servicing and Refueling of Equipment
S 15.12 Control of Construction In Riparian Areas
S 15.13 Controlling In-Channel Excavation
S 15.14 Diversion of Flows Around construction Sites
S 15.15 Stream crossings on Temporary Roads
S 15.16 Bridge & Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
E. 15.17 Regulation of Borrow Pits, Gravel Sources, and Quarries
E 15.18 Disposal of Right-of-Way and Roadside Debris
S 15.19 Streambank Protection
E 15.21 Maintenance of Roads
E 15.22 Road Surface Treatment to Prevent Loss of Materials
E 15.23 Traffic Control During Wet Periods
G 15.24 Snow Removal Controls
E 15.25 Obliteration of Temporary Roads
E 15.27 Trail Maintenance and Rehabilitation

18 FUELS MANAGEMENT

E 18.02 Formulation of Fire Prescriptions
E 18.03 Protection of Soil and Water from Prescribed Burning Effects

*** CLASSES OF SWCP (BMP)**

A = Administrative G = Ground Disturbance Reduction
E = Erosion Reduction W = Water Quality Protection
S = Stream Channel Protection/Stream Sediment Reduction

Best Management Practices

PRACTICE 14.03 - Use of Sale Area Maps for Designating Soil and Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and special treatment areas, to insure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High

COMPLIANCE: No related FPA rule

IMPLEMENTATION: The following features will be designated on the SAM:

The stream courses (perennial, intermittent, and ephemeral) listed below will be designated as Stream Course Protection areas to be protected under the TSC. During layout of the units these areas will be excluded where possible. Where these areas cannot be easily excluded from the unit, these areas will be excluded by designating the timber as leave trees. INFISH standards and protected stream courses will be applied to the following areas:

a. Wetlands (meadows, lakes, potholes, etc.) to be protected per the timber sale contract clauses are those designated on the Fish and Wildlife Service 1:24000 scale wetland maps.
b. Ephemeral channels will be protected through unit layout, marking plans, and/or designation on sale area maps.

The Purchaser and the Sale Administrator prior to harvesting will review these features on the ground.

A Watershed Specialist (Forest or District) will work with the Presale Forester to insure that the above features have been designated on the Sale Area Map during contract development.

PRACTICE: 14.11 - Log Landing Erosion Prevention and Control
PRACTICE: 14.12 - Erosion Prevention and Control During Timber Sale Operations
PRACTICE: 14.15 - Erosion Control on Skid Trails.

OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following minimum criteria will be used in controlling erosion and restoring landings and skid trails so as to minimize erosion:

General:

1) Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable outside of Riparian Habitat Conservation Areas.

2) Seeding will be done with a seed/fertilizer mix specified in the contract.

Landings:

1) Landings will not be located in ephemeral draws or swales that were created by or are prone to landslides.

2) During period of use, landing will be maintained in such a manner that debris and sediment are not delivered to any streams.

3) Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed.

4) Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.

Skid Trails:

1) Unit design and location will facilitate logging with a minimum amount of excavated skid trails. Where excavated trails are constructed they will be kept to a minimum and must be obliterated by the purchaser following completion of the logging activities. The obliteration will include restoring natural slope contours and placing slash and logs on top of the disturbed soil, and use of seeding where needed.

2) Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.

3) Spacing of water bars on skid trails will be based on guides for controlling sediment from secondary logging roads (no date). If necessary, additional water bars will be prescribed by the sale administrator and/or watershed specialist.

4) All skid trail and landing locations will be approved by the Forest Service prior to harvesting and will be rehabilitated as necessary to assure that normal drainage patterns are maintained, and that exposed soil surfaces are seeded or covered with slash. This will minimize the potential for sediment production and delivery.

5) Skid trail distance will average 100 feet or greater on ground skidded units, except where the trails converge to landings and as terrain dictates otherwise. This measure will help assure that

no more than 15 percent of the activity area will be detrimentally disturbed per Region-1 soil standards.

6) Mechanical fellers will only be allowed off skidtrails if they travel on snow, frozen ground, or a slash mat (to avoid soil compaction levels that exceed Region 1 standards).

Corridors:

1) Corridors that have become entrenched below the litter layer into the topsoil and could channel water will be water-barred and/or covered with debris.

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

OBJECTIVE: To assure the adequacy of required erosion control work on timber sales.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA rule.

IMPLEMENTATION: The TSC requires that upon the Purchaser's written request and assurance that work has been completed the Forest Service shall perform an inspection. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. The Forest Service will not accept as complete, erosion control measures that fail to meet this criteria.

PRACTICE 15.07 - Control of Permanent Road Drainage

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following items will be included in the identified road contract specifications or drawings.

1) For Reconstruction - The following criteria will be incorporated into the road design:

    a. The reconstruction will include increasing pipe sizes or changing design on many of the existing

PRACTICE 15.14 - ***Diversion of Flows Around Construction Sites***

OBJECTIVE: To minimize downstream sedimentation by insuring that all stream diversions are carefully planned.

EFFECTIVENESS: High

COMPLIANCE: Meets SCA Rules

IMPLEMENTATION: Flow in stream courses may only be diverted if the Forest Service deems it necessary for the contractor to meet contractual specifications. Such a diverted flow shall be restored to the natural stream course as soon as practicable. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment.

PRACTICE 15.21 - ***Maintenance of Roads***

OBJECTIVE: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: For roads in active timber sale areas standard TSC provisions require the Purchaser to perform or pay for road maintenance work commensurate with the Purchaser's use. Purchaser's maintenance responsibility shall cover the before, during and after operations period during any year when operations and road use are performed under the terms of the Timber Sale Contract. All maintenance work shall be done concurrently, as necessary, at least to the following minimum standards:

1) Culverts and ditches shall be kept functional.
2) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or waterbarred, and berms removed from the outside edge except those intentionally constructed for protection of fills.
3) The road surface shall be maintained as necessary to minimize erosion of the sub-grade and to provide proper drainage.
4) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams.
5) Sidecast of all material associated with road maintenance will be done in a manner to prevent its entry into streams.
6) Slumps, slides and other erosion features causing stream sedimentation will be kept repaired and stabilized.

PRACTICE 18.02 - Formulation of Fire Prescriptions
PRACTICE 18.03 - Protection of Soil and Water form Prescribed Burning

OBJECTIVE: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients and debris from entering surface water.

EFFECTIVENESS: High

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellant tendencies as part of the environmental analysis. Some of the techniques used to prevent soil erosion and water quality degradation are:(1) construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

1) Foaming agents will not be used for water control lines where any of the ephemeral channels could carry the material to intermittent or perennial streams.

2) Machine constructed firelines will not be used on the sensitive landtypes

3) Firelines must be frequently waterbarred (not to exceed 50 foot spacing when going up and down the hill).

4) Maintain large organic debris appropriate to the habitat type (see "Managing Coarse Woody Debris in the Forests of the Rocky Mountains" by Graham et. al. 1994).

5) Limit prescribed burning to those times when surface soil moisture is above 25 percent to reduce the potential for damage from hot burns.

GLOSSARY OF SILVICULTURAL PRESCRIPTIONS

INTERMEDIATE TREATMENTS

Treatments designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest.

Thinnings

Precommercial Thinning (PCT) - Thinnings made purely as investments in the future growth of stands so young that none of the felled trees are extracted and utilized. The trees to be cut or retained are chosen on the predetermined basis or pattern with little or no regard for their position in the crown canopy. This technique can often be used in young stands that have not been thinned previously and are densely crowded. The arbitrary basis on which the trees are selected is justified in highly uniform stands that have not differentiated into crown classes (Smith, 1962).

Sub-commercial Thinning (SCT) - The intent of sub-commercial thinning is basically the same as precommercial thinning, i.e., an investment in the future growth of young stands. In sub-commercial thinning trees cut are normally between 3 inches and 6.9 inches d.b.h. All trees 7.0 inches d.b.h. and larger (i.e., those meeting typical sawlog standards) are left for later treatment. However, with sub-commercial thinning the felled trees are removed and utilized as posts, tree stakes or fiberwood (pulp, chipboard, etc.). Specifications for trees to be removed can be set up on standard spacing, or based on live crown ratios of the trees to be harvested. For example, the prescription may call for all coniferous species that have live crown ratios of less than 40% to be removed.

Commercial Thin (CT) - Intermediate harvest that does not result in regeneration. Used primarily with even-age systems prior to regeneration harvest, but would not eliminate opportunity to convert stand at a later date to uneven-age systems. The primary objectives of a commercial thinning are to stimulate growth of the residual stand, increase total yield, and utilize material that is suppressed. Treatment would remove approximately 1/3 of the stand, leaving larger trees evenly spaced with crowns free to grow before canopy closure occurs again.

Basal Area Thinning (BAT) - Intermediate harvest designed to reduce predominantly lodgepole pine stand susceptibility to infestation of mountain pine beetle by increasing bole temperatures. Treatment will remove up to 50% of the stand, leaving 80 to 90 square feet of basal area per acre. Larger trees will be left evenly spaced. Treatment is not designed to result in regeneration, however, some may occur. This treatment has been used successfully on the Flathead National Forest to reduce mortality in stands in the vicinity of mountain pine beetle epidemics.

Stand Improvement Treatments

Improvement Cutting (IC) - The removal of less desirable trees of any species in a stand of poles of larger trees, primarily to improve composition and quality.

Sanitation Salvage (SS) - The removal of trees to improve stand health by stopping or reducing actual or anticipated spread of insects and disease (sanitation). The removal of dead trees or trees being damaged or dying due to injurious agents other than competition, to recover value that would otherwise be lost (salvage).

Release Treatments

Liberation Cutting (LC) - A release treatment made in a standnot past the sapling stage to free the favored trees from competition with older, overtopping trees.

REGENERATION METHODS

A cutting method by which a new age class is created. Four regeneration methods often used in the Western U.S. are Clearcutting, Seed Tree, Shelterwood, and Selection.

Even-Aged Methods

Methods designed to regenerate a stand with a single age class. For all of these types of cuttings any overwood trees are removed after regeneration is established.

Clearcut (CC) - the cutting of essentially all trees, producing a fully exposed microclimate for development of a new age class.

Seed Tree (ST) - the cutting of all trees except those for a small number of widely dispersed trees retained for seed production and to produce a new age class in a fully exposed microenvironment.

Shelterwood (SW) - the cutting of of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment..

Two-aged Methods

Methods designed to maintain and regenerate a stand with two age classes due to the long-term retention of reserve trees in the stand.

Clearcutting with Reserves (CCR) - A clearcutting method in which varying numbers of reserve trees are not harvested to attain goals other than regeneration.

Seed Tree with Reserves (STR) - A seed tree method in which some or all of the seed trees are retained after regeneration has become established to attain goals other than regeneration.

Shelterwood with Reserves (SWR) - A variant of the shelterwood method in which some or all of the shelter trees are retained, well beyond the normal period of retention, to attain goals other than regeneration.

Uneven-aged (Selection) Methods

Methods of regenerating a forest stand, and maintaining, an uneven-aged structure, by removing some trees in all size classes either singly, in small groups, or in strips.

Group Selection (GS) - A method of regenerating uneven-aged stands in which trees are removed, and new age classes are established, in small groups. (Note: The group selection method is often confused with the clearcutting method. However, with the clearcutting method the entire stand is regenerated with one entry and with the group selection method the stand is regenerated through a series of evenly timed cutting cycles. For example, given a 100 acre stand and a 25-year cutting cycle, approximately 1/4 of the stand, or 25 acres, would be regenerated every 25 years. The size of the groups would vary depending on regeneration objectives, but generally would range from 1-5 acres. With the clearcutting system the entire 100 acre stand would be regenerated with one entry).

Group Selection with Reserves (GSR) - A variant of the group selection method in which some trees within the group are not cut to attain goals other than regeneration within the group.

Single Tree Selection (STS) - A method of creating new age classes in uneven-aged stands in which individual trees of all size classes are removed more-or-less uniformly throughout the stand to achieve desired stand structural conditions.

Other Methods

Irregular Shelterwood (ISW) - A regeneration method characterized by variation in age structure (usually uneven-aged) or in spatial arrangement of trees..

Shelterwood Prep Cut (SWP) - An optional preparatory cut designed to enhance conditions for seed production.

APPENDIX E

Table E-1. Old Growth Stands within OGMU 19 and 20

Stand ID	OGMU	Acres	Old Growth Code	Forest Habitat Type
71901002	19	46	9	DRY
71901007	19	46	9	DRY
71901030	19	48	9	DRY
71901036	19	47	9	DRY
71901072	19	25	9	DRY
71901082	19	12	11	DRY
71901084	19	9	9	DRY
71901091	19	38	9	DRY
71901093	19	195	9	DRY
71901097	19	17	9	DRY
72001002	20	44	9	COOL-MOIST
72001012	20	30	9	MOIST
72001014	20	13	9	COOL-MOIST
72001017	20	27	9	MOIST
72001018	20	39	9	MOIST
72001020	20	22	9	COOL-MOIST
72001035	20	7	9	COOL-MOIST
72001043	20	22	9	COOL-MOIST
72001044	20	15	9	COOL-MOIST
72001045	20	18	9	COOL-MOIST
72001046	20	13	9	MOIST
72001047	20	23	9	MOIST
72001048	20	17	9	MOIST
72001058	20	17	9	MOIST
72001059	20	148	9	MOIST
72001060	20	20	9	MOIST
72001061	20	41	9	MOIST
72001062	20	47	9	MOIST
72001064	20	16	9	COOL-MOIST
72001072	20	10	9	COOL-MOIST
72001074	20	13	9	MOIST
72001075	20	18	9	MOIST
72001076	20	13	9	MOIST
72001079	20	8	9	COOL-MOIST
72001083	20	23	9	MOIST
72001087	20	8	9	MOIST
72002074	20	95	9	MOIST
72003019	20	10	9	MOIST
72003020	20	11	9	MOIST
72003021	20	30	11	COOL-MOIST
72003022	20	10	9	MOIST
72003033	20	7	11	MOIST
72003034	20	11	11	MOIST

Stand ID	OGMU	Acres	Old Growth Code	Forest Habitat Type
72003035	20	12	9	COOL-MOIST
72003050	20	22	9	COOL-MOIST
72003054	20	54	9	MOIST
72003062	20	24	9	COOL-MOIST
72003063	20	33	9	MOIST
72003069	20	21	9	COOL-MOIST
72003084	20	24	9	MOIST
72004012	20	19	9	MOIST
72004014	20	17	9	MOIST
72005001	20	26	9	MOIST
72005010	20	16	9	COOL-MOIST
72005012	20	8	9	MOIST
72005018	20	16	9	MOIST
72005020	20	42	9	MOIST
72005024	20	28	9	MOIST
72005027	20	24	9	COOL-MOIST
72005044	20	24	9	MOIST
72009008	20	21	9	DRY
72009027	20	18	9	DRY
TOTALS		**1778**		

Allocated Existing Old Growth *(codes 9);* Allocated Potential Old Growth *(code 11)*

Table E-2. Non Allocated Recruitment[1] Stands within OGMU 19 and 20

Stand ID	OGMU	Acres	Forest Habitat Type
71901025	19	19	COOL-MOIST
71901059	19	23	DRY
71901061	19	77	DRY
71901086	19	19	DRY
72001001	20	18	MOIST
72001008	20	12	COLD-DRY
72001013	20	9	COOL-MOIST
72001015	20	13	COOL-MOIST
72001016	20	27	COOL-MOIST
72001019	20	39	MOIST
72001021	20	39	COOL-MOIST
72001052	20	10	MOIST
72001073	20	9	MOIST
72005005	20	53	COOL-MOIST
72005038	20	27	MOIST
72009055	20	26	MOIST
	20	**420**	

Non-Allocated Recruitment (*code 8*)

[1]These stands are NOT part of the District's 64,625 acres (16%) of allocated old growth nor the IPNF's 276, 494 acres (12%) of allocated old growth. These recruitment stands do NOT meet the IPNF's old growth standards as described in Green et al (1992). Additionally, there are no Forest Plan standards that address recruitment stands. Information regarding recruitment stands is provided in response to comments from the DEIS.

Table E-3. Old Growth Stands with Proposed Treatments[2] –Alternatives 2 and 4

Stand ID	OGMU	Treatment Unit(s)	Old Growth Code	Treatment Acres in Old Growth
71901002	19	22	9	31
71901030	19	26	9	16
71901072	19	28	9	23
71901091	19	30	9	38
71901093	19	28, 30	9	194
71901097	19	30	9	7
72009008	20	4	9	19
72009027	20	3, 4	9	16
TOTALS				**344**

Table E-4. Old Growth Stands with Proposed Treatments –Alternative 3

Stand ID	OGMU	Treatment Unit(s)	Old Growth Code	Treatment Acres in Old Growth
71901002	19	22	9	31
71901030	19	28	9	16
71901036	19	30	9	1
71901072	19	28, 30	9	23
71901091	19	30	9	38
71901093	19	4	9	194
71901097	19	3, 4	9	7
TOTALS				**310**

[2]Proposed treatments in all alternatives are **Improvement Cut** prescriptions in dry forest types

Table E-5. Recruitment Stands with Proposed Treatments – Alternative 2

Stand ID	OGMU	Treatment Unit(s)	Forest Habitat Type	Treatment Acres in Recruitment Stands
71901025	19	33	COOL-MOIST	1
71901059	19	27	DRY	2
71901061	19	27, 32	DRY	73
72001008	20	41	COLD-DRY	2
72001015	20	41	COOL-MOIST	1
72005005	20	111	COOL-MOIST	2
TOTALS				**81**

Table E-6. Recruitment Stands with Proposed Treatments – Alternative 3

Stand ID	OGMU	Treatment Unit(s)	Forest Habitat Type	Treatment Acres in Recruitment Stands
71901025	19	33	COOL-MOIST	1
71901059	19	27	DRY	2
71901061	19	27, 32	DRY	73
72005005	20	111	COOL-MOIST	2
TOTALS				**78**

Table E-7. Recruitment Stands with Proposed Treatments – Alternative 4

Stand ID	OGMU	Treatment Unit(s)	Forest Habitat Type	Treatment Acres in Recruitment Stands
71901059	19	27	DRY	2
71901061	19	27, 32	DRY	73
TOTALS				**75**

Figure E-1. Mission Brush Old Growth Stands and Proposed Treatments–Alternative 2

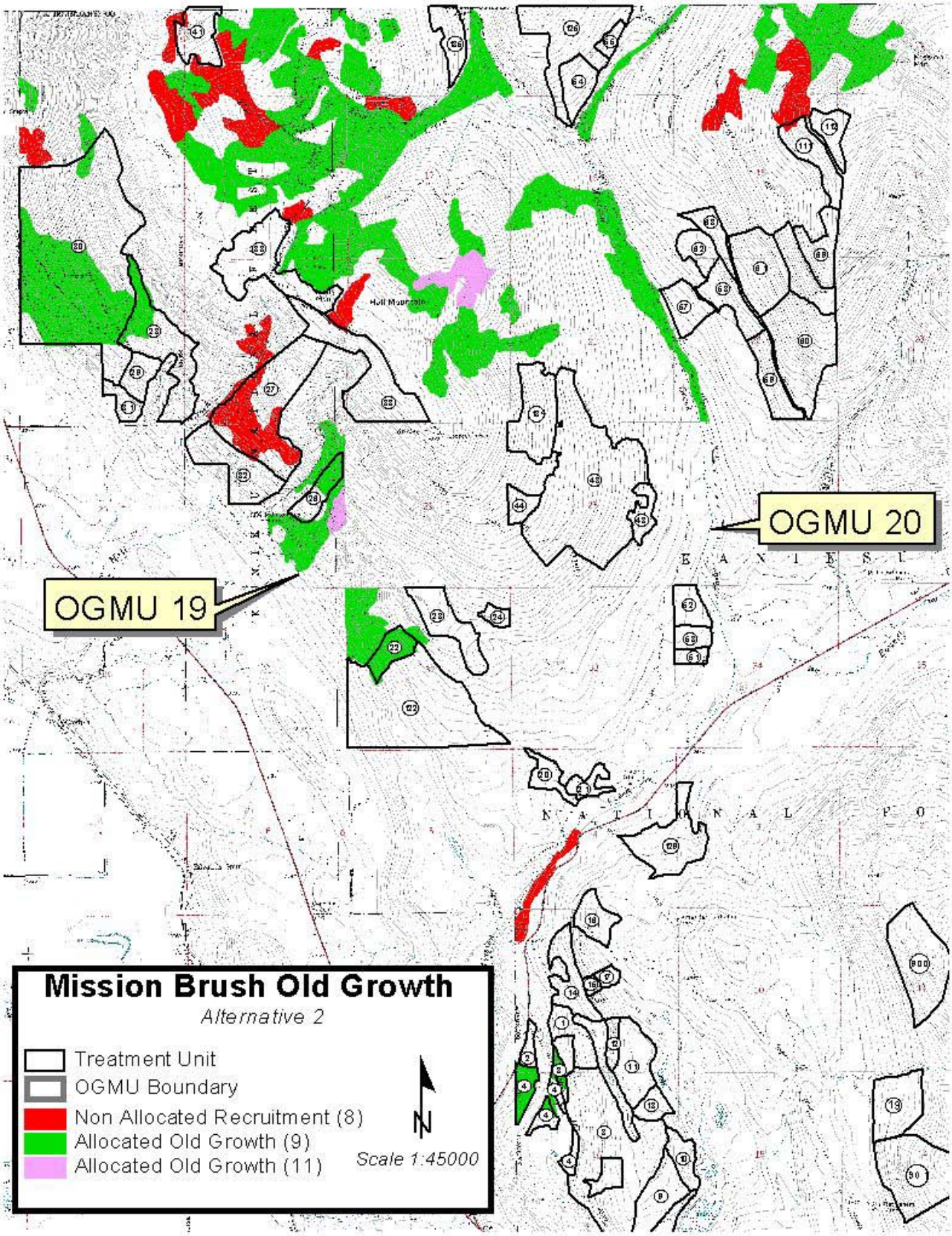


Figure E-2. Mission Brush Old Growth Stands and Proposed Treatments–Alternative 3

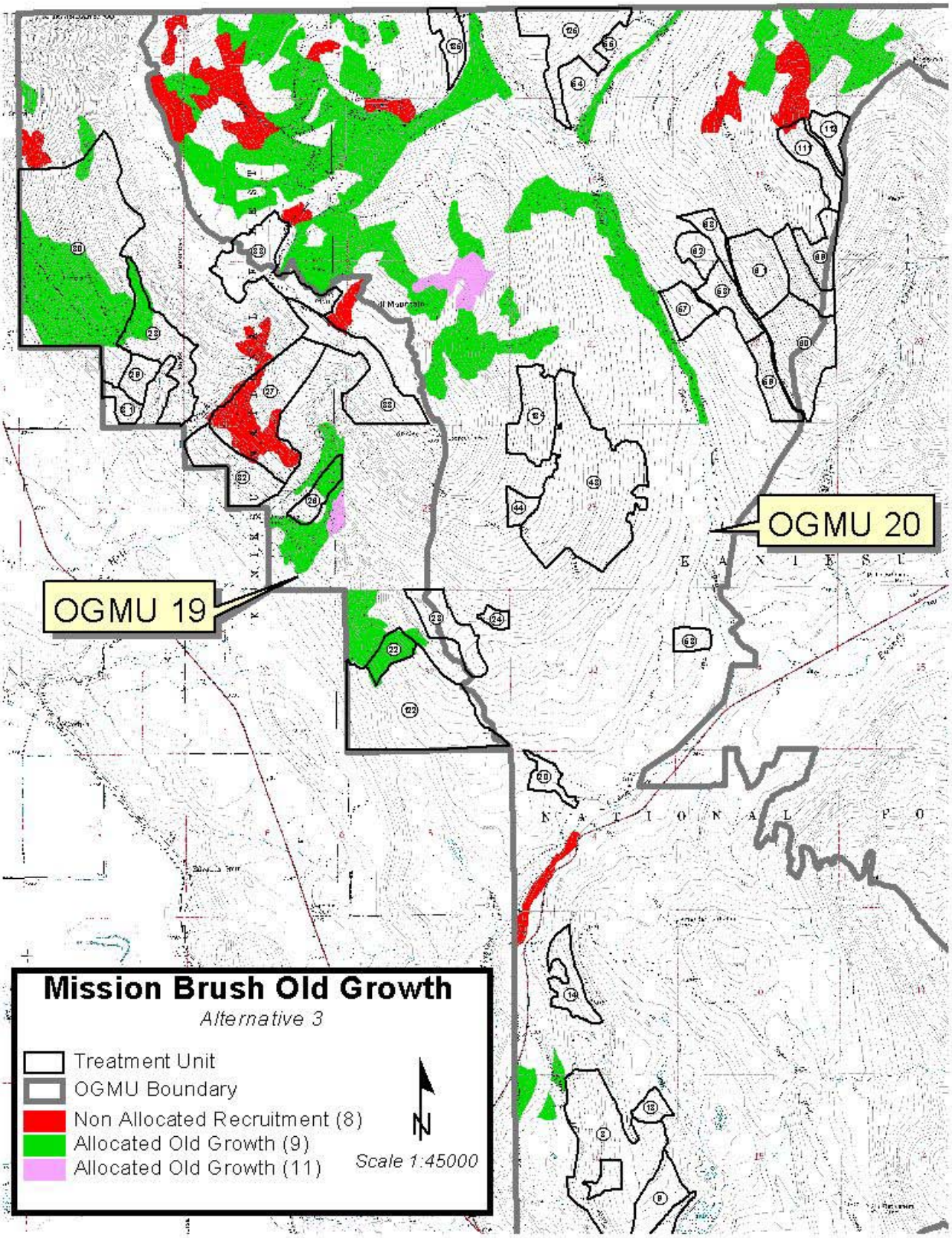
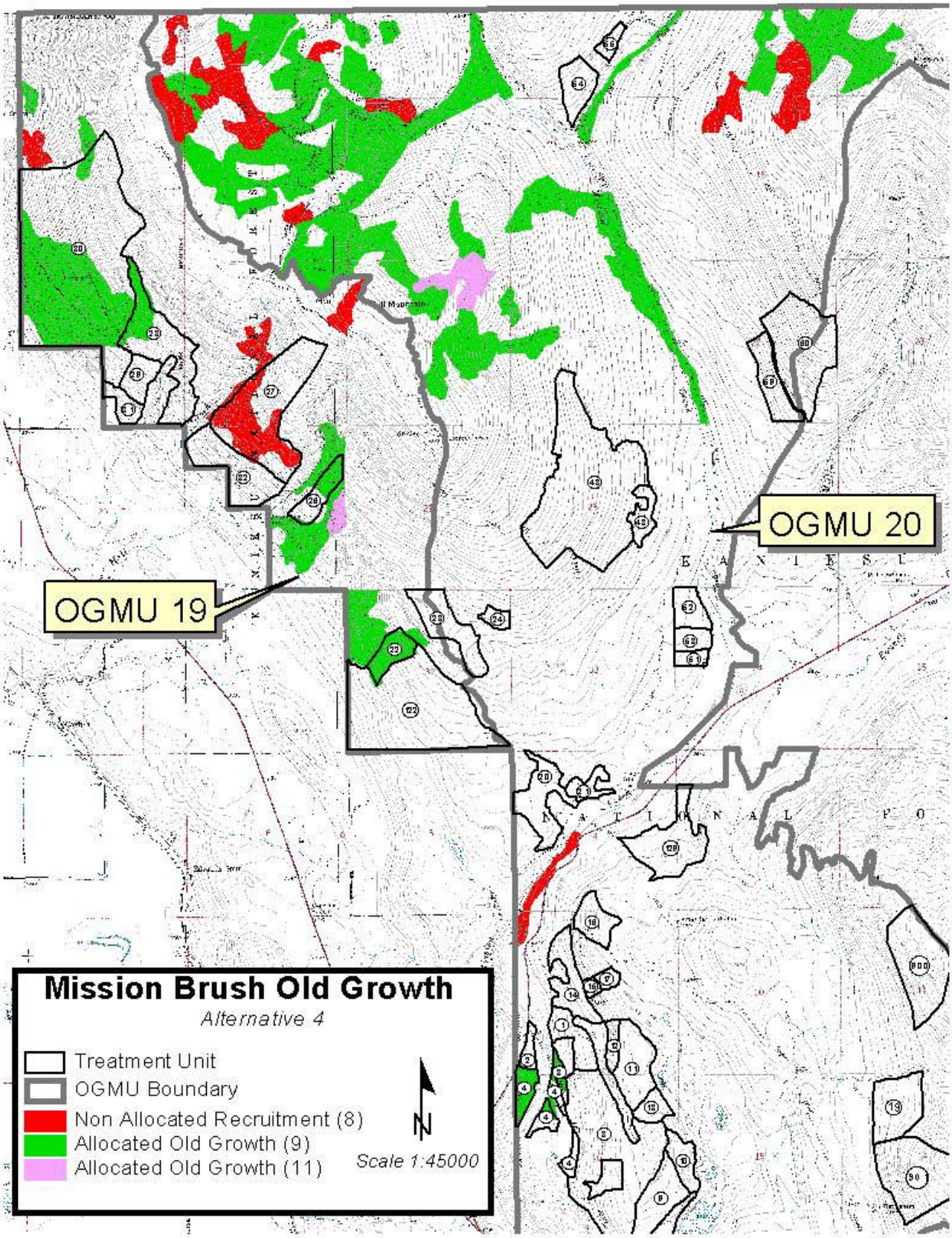


Figure E-3. Mission Brush Old Growth Stands and Proposed Treatments–Alternative 4



Appendix F – Response to Comments

APPENDIX F – RESPONSE TO COMMENTS 1

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Introduction

This appendix contains the substantive comments received on the Draft EIS for the Mission Brush project and the agency's responses to the comments. Comments (letters, records of phone calls or personal visits, e-mails, or other formats) are part of the public record and are included in the Mission Brush project file located at the Bonners Ferry Ranger District.

Public review and comments did not disclose any new major issues or need for new, significant analysis.

Example: Comments are displayed in italicized text and designated by a resource category and then numbered sequentially within the resource in the following style:
1-A. Comment: *Given the controversy, the FS should be considering...*

Agency responses are identified by the following text style:
Response: This EIS does not propose removing old growth stands...

1 - Old Growth

1-A. Comment:
Given the controversy surrounding the issue of old growth and old-growth species' viability, and given the fact that the FS and other ownerships in and around IPNF have vastly reduced old growth and old-growth habitat, the FS should be considering an alternative that does not log mature and old forests.

The FEIS ignores the prevailing lack of scientific support for Forest Plan amounts and distribution of old-growth as sufficient for maintaining viable populations of wildlife species such as black-backed woodpecker, flammulated owl, white-headed woodpecker, pine marten, fisher, and pileated woodpecker.

Response: This EIS does not propose removing old growth stands or the habitat they provide, from the landscape. In fact, the objectives are to restore and protect the existing old growth stands and trend mature stands into old growth status, especially in the dry site type of old growth stands where the risk of stand replacement fire is high. In these ecologically valuable old growth stands, restoration treatments propose removing the fire prone ladder fuels from underneath and around the larger trees to protect them from moisture stress, insect attack, and the risk of crown fires. The ladder fuels are usually composed of smaller fir trees that have invaded the stands since the role of fire was essentially removed from these old growth stands as explained in the FEIS (pgs. 3-16 – 3-25).

Forest Plan standards require maintenance of at least minimum viable populations of MIS distributed throughout the Forest. Monitoring of population viability is conducted at the Forest level. The district has conducted surveys for selected MIS and these surveys are part of the project record. Project level analysis discloses the effects that various management alternatives would have on habitat quality of selected species and population viability (See Chapter 4- Wildlife section). The analysis in the Mission Brush FEIS includes the No Action alternative and three action alternatives.

- Refer to the purpose and need for the project on FEIS page 1-4. Ignoring or excluding the old growth in the project area would be contradictory to the project objectives.
- Refer to the description of Alternative 7 in the FEIS on page 2-11. This alternative proposed underburning in the old growth stands with no commercial harvesting. It was dropped from further analysis due to the fact that meeting stand objectives would require that the underburn be conducted during the drier time of the year, when the risk of fire escaping onto adjacent private land would be unacceptable.
- Consistency with Forest Plan old growth standards are discussed in the FEIS at 4-31 through 4-33. Under the No Action alternative "Forest Plan Standards for old growth maintenance and distribution would be met. However, the long-term integrity of dry forest old growth would be dubious, given the risk of stand replacing fire would continue to increase over time."

- The restoration treatments in the old growth stands propose the use of Improvement Cutting (FEIS Chapter 2-Vegetation).
- See "Forest Plan Consistency" in the FEIS on 4-32, 4-33 where there will be no net loss of allocated old growth with any of the action alternatives.

1-B. Comment:
The FEIS attempts to demonstrate consistency with only one Forest Plan old growth standard. What about the rest?

Regarding Forest Plan old growth standard 10a, the FS must disclose the criteria it uses to consider any area as old growth.

Response: The latest old growth discussion is located in the 2002 Monitoring and Evaluation Report, pg 68. This report is available on the IPNF website.

Forest Plan Standards call for us to maintain 231,000 acres of old growth (10% of our forested acres). We have identified and allocated 276,494 acres (12.0% of forested acres) to be retained as old growth. We also have an additional 5,859 acres (0.3% of forested acres) of field verified unallocated old growth, which provides old growth habitat for wildlife and serves other ecological functions. Not showing [in the table below] are an additional 9,756 acres that have been aerial photo identified as likely old growth, but have not yet been field checked. (2002 Monitoring Report, p. 68)

The Mission Brush FEIS mentions old growth standards and consistency with the Forest Plan on pages 3-27, 28, 32, and 4-31 through 4-33.

Old growth standards are found on page II-29 in the Forest Plan, Standards 10a – 10i are discussed in the Vegetation section of the FEIS in Chapters 3, 4 and Appendix E.

- 10 (a) – Definition of Old Growth.
- 10 (b), (c), (d) – Maintenance, selection and potential harvest in old growth.
- 10 (e), (f) – Old growth stand characteristics and size (DEIS 3-25).
- 10 (g) – Road locations. No Forest Service roads (permanent or temporary) are proposed in old growth stands (FEIS 2-68, and 3-35).
- 10 (h) – Issuance/continuance of grazing allotments. There are no grazing allotments within the Mission Brush project area.
- 10 (i) – Management area prescriptions and goals for old growth. (FEIS 1-17 through 19, and Table 2 of the 2002 Forest Plan Monitoring Report, page 69)

1-C. Comment:
On page I-I of the DEIS the assessment area is described as including approximately 16,550 acres of National Forest lands. On page 3-26 of the DEIS it is stated the Mission Brush project area is about 23,000 acres and the project area supports about 2000 acres of old growth. On page 4-28 of the DEIS it is stated the project area encompasses about 22,500 acres, with 1,960 acres of old growth being managed in the project area. On pages 3-26 and 4-28 it is also stated that over 800 acres of dry site old growth exist in the project area.

NEPA at 40 CFR 1500.1 (b) requires high quality information and expert agency comments. The statements made of pages 3-26 and 4-28 imply that the acres of old growth cited are found in areas other than on the National Forest lands.

Response: Thank you for finding the discrepancies.
On page 3-27, the information regarding old growth has been clarified. The amount of old growth has been related to old growth management units (OGMUs) since this relates directly to the IPNF's standards. The latest figures indicate there are 1,778 acres of allocated old growth stands in the project area (OGMUs 19 and 20).

1-D. Comment:
The FEIS needs to supply high quality information with accurate scientific analysis regarding the number of acres of recruitment old growth that currently exist on the 16,550 acres of National Forest lands and the stand numbers for the stands that contain recruitment old growth. Table 2- 7 on page 2-24 describes the dry forest stands that contain large-diameter ponderosa pine, Douglas-fir, and western larch. The 8 units listed amount to 951 acres. The FEIS needs to list the stand numbers for the stands that are located within the 8 units described on page 2-24.

Response: Please refer to Appendix E of the FEIS.

1-E. Comment:
On pages 4-29 and 4-30 it is indicated the Action Alternatives would enter from about 400 acres to 440 acres of dry site old growth stands. There is no information on these pages as to the minimum and maximum size of the trees that would be logged in the dry site old growth stands. There is also no information that describes the species of trees that would be logged.

Response: See FEIS Chapter 2 "Improvement cutting" and the "Silvicultural Treatment Summaries" for each alternative (FEIS, Table 2-7).

2 - Invasive Species

2-A. Comment:
We recommend that the FEIS show how the Action Alternatives, especially the Preferred Alternative, adequately supports Executive Order (EO) 13112 on invasive species. The DEIS does not adequately discuss how proposed federal actions will comply with this EO.

Response: Refer to FEIS on 2-48, 2-50 and A-1 for noxious weed mitigation measures. With regards to white pine blister rust, it is by definition an invasive pest (fungus) from Europe as explained in the FEIS on 3-13.

2-B. Comment:
The DEIS states that ponderosa pine was planted in the project area using a genetic stock from unknown sources (page 3-18). The DEIS further states that this pine seed has not adapted to local conditions as evident by its declining vigor. Yet the DEIS has not directly stated what the FS preferred option is for establishing stocks within the project area. EPA strongly supports the introduction and usage of only regional derived tree stock and genetic strains that are adapted to local environmental conditions to support persistence and stability of habitat and biodiversity. This direction would be consistent with the Purpose and Need of the proposed project.

Response: Refer to FEIS in A-1 under Biodiversity / Native Plant Species and in the tiered document IPNF Forest Plan on II-32. Direction for Region 1 of the US Forest Service, "...is to emphasize the importance of biodiversity, and to recognize the intrinsic value of native plant vegetation as a component of natural forest and rangeland ecosystems." Forest Plan timber standard #4 (p. II-32) states, "Reforestation will normally feature seral tree species, with a mixture of species usually present. Silvicultural practices will promote stand structure and species mix which reduce susceptibility to insect and disease damage."

3 - Vegetation

3-A. Comment:
On page 3-21 of the DEIS the discussion of western larch states that it is the major species of about 12% (265) acres in the project area.
This figure does not appear correct, as 12% of 16,550 acres is approximately 1,986 acres. The FEIS needs to indicate which figure is correct for acres of western larch in the project area.

Response: Thank you for catching the error. The correct sentence should read. Western larch is the major species on about **1,986** acres, not 265 acres.

3-B. Comment:
On page 3-22 the following statement is made. "Douglas-fir is at an age where combinations of root diseases and bark beetles begin to create high mortality." There is no supporting data in the DEIS that describe the number of acres of DF on National Forest lands are at an age where root diseases and bark beetles have created high mortality.

There are no totals given in the DEIS regarding the acres of grand fir, lodgepole pine, western red cedar, and western hemlock that are currently found in the 16,550 acre analysis area.

The DEIS lacks accurate scientific analysis and high quality information, NEPA at 40 CFR 1500.1 (b), that supports the contention there is a large amount of old DF that is creating high mortality across the 16,550 acre analysis area. The book "Western Forest Insects" by R. L. Fumiss and V.M. Carolin, USDA Forest Service 1977, [Miscellaneous Publications No.1339] and reprinted in 1980, contained an extensive discussion of bark beetles and Douglas- fir trees. The research by the Forest Service entomologists did not describe a direct correlation of tree age, specific root diseases, bark beetles, and high tree mortality across all stands of Douglas-fir in the Northwest. The FEIS needs to cite the specific literature other than the NZGA draft document that is the scientific basis for the claim made on page 3-22.

Response: Forest types are listed in figure 3-21 of the FEIS.
Several tree and stand characteristics have been found to be conducive to Douglas-fir beetle abundance and damage in the Northern Rocky mountains. The proportion of Douglas-fir in a stand, its density and age are positively correlated with susceptibility. Any of these factors can limit damage, but high density can result in younger trees being attacked. Age of trees attacked during an outbreak on the Clearwater National Forest from 1971-1974 ranged from 78-172 with an average of 111 (Furniss et al. 1979). A hazard rating system developed in southern Idaho assigned trees less than 80 years old as low hazard, 80-120 as moderate, and more than 120 as high (Weatherby and Thier 1993). In British Columbia, a stand susceptibility rating assigns similar values – less than 80 years old is low, 80-119 is moderate, 120-149 is high, and 150+ is very high (Shore and Safranyik 1999). In summary, dense stands of Douglas-fir start becoming susceptible at about 80 years old and susceptibility increases as they get older.

Furniss, M.M, McGregor, M.D., Foiles, M.W., and Partridge, A.D. 1979. Chronology and characteristics of a Douglas-fir beetle outbreak in northern Idaho. USDA For. Serv. Gen. Tech. Rpt. INT-59. 19 p.

Weatherby, Julie C. and Their, R.W. 1993. A preliminary validation of a Douglas-fir beetle hazard rating system, Mountain Home Ranger District, Boise National Forest. Forest Health Protection Rpt. No. R4-93-05. 7 p.

Shore, T.L. and Safranyik, L. 1999. A susceptibility and risk rating system for the Douglas-fir beetle in British Columbia. 4 p.

4 - Restoration and Historic Condition

4-A. Comment:
Historic documents do not agree that the existing condition of our Northern Idaho forests are outside a historic range. Is the Forest Service talking about conditions 100 to 200 years ago, or a scientifically based range over the past ten thousand years or some other methodology?

Response: The “Purpose and Need” of the Mission Brush FEIS (pages 1-4, 5) was derived from a number of scientific assessments (pages 1-5 to 1-6) conducted at various time frames and landscape scales, including the Interior Columbia Basin Ecosystem Management Project (ICBEMP), the Northern Region Overview, and the North Zone Geographic Assessment (NZGA). The Lieberg reports (USGS 1895-1898), cited in the comment by the Lands Council, were primary sources of information used to assess vegetation conditions in the same area as the NZGA.

The findings of these assessments were compared to existing vegetation conditions in the Mission Brush project area to determine a site-specific proposed action. The objectives of the Mission Brush project focus on improving ecosystem composition, structure, and diversity of the landscape by providing for tree species and stocking levels similar to historic levels. More specifically, to reduce the number of trees per acre of Douglas-fir, and favor the development of large diameter ponderosa pine and western larch on dry forest types and reestablish western white pine as a significant component of its historic range (FEIS, page 1-4). As described in Chapter 3 Vegetation, the estimated levels of ponderosa pine, white pine, and western larch are well below estimated historic levels in the project area. The changes are summarized below:

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%

The District is not concerned that Douglas-fir, grand fir and western hemlock are components of the forested ecosystem, the concern is the disproportionate level at which these species are represented and their increasing trend relative to historical conditions. The objective is not so much to eliminate these species from the ecosystem, rather to increase the levels of long-lived seral species (ponderosa pine, white pine, and western larch), which have been reduced at all of the geographic scales described in the FEIS and the documents it is tiered to.

4-B. Comment:
What is the model for stand succession that the Forest Service is using for the 25,000 acres of clearcuts and near-clearcuts?

Response: The Mission Brush project area contains about 16,500 acres of National Forest land; we are proposing development of a 15-acre seed orchard, embedded within Unit 134 a proposed shelter wood harvest. This is the only “clearcut” proposed for this project.

4-C. Comment:
Good management requires good science but there is no documentation that planting white pine in clearcuts has ever grown mature trees, let alone old growth.

Response: One of the objectives of this project is to reestablish western white pine as a significant component of its historic range. Developing mature and old growth white pine will be a long-term process, but one that can not begin without the establishment of white pine seedlings. The FEIS includes several citations that discuss the ecological needs of western white pine, ponderosa pine, larch and how the District plans to re-establish this species. The Mission Brush FEIS Vegetation sections in Chapters 3 and 4 utilize references such as: “Because of their relative intolerance to 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, or through cultural treatments (thinning) favoring the species (USDA 1990).”

“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). In particular, 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 (et al, 1994). 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 or natural regeneration.” A newer piece of science that specifically discusses the needs of white pine ecosystems, is the September, 2003 Managing for Healthy White Pine Ecosystems in the U.S. to Reduce the Impacts of White Pine Blister Rust.

4-D. Comment:
Please disclose the specifics of previous logging projects in the analysis area that failed to deal with the alleged white pine HRV problem: the numbers of acres of clearcuts that weren't planted to white pine, etc.

More generally, disclose the specifics of previous logging projects in the analysis area that failed to increase the "Acres trended towards restoration of historic forest structures" and/ or failed to increase the "Acres trended towards restoration of long-lived seral species" (FEIS at 2-4). We're confident that if the FS include such analyses of its previous mistakes, the real problems will be

identified and fire, insects, root diseases, etc. will be seen as simply natural processes that are acting as balancing agents against previous under informed management.

Response: Refer to Table 3-1 in the FEIS for the acres regenerated through tree planting and natural regeneration. White pine and other species such as larch and ponderosa pine have been planted since the planting program started. The areas that were treated have been trended toward HRV and included in the analysis with regards to forest composition and structure as discussed in the FEIS, Chapter 3.

4-E. Comment:
How will clearcutting or leaving 20-30 or less trees per acre return those sites to the historic recorded condition of 100 years ago?

Response: As explained in the FEIS in Chapter 3, seral species that are shade intolerant are being replaced by shade tolerant species from the landscape scale down to the stand level scale. The only way to counter the current trend away from historical and sustainable conditions is to regenerate seral species by opening up the canopy, giving the shade intolerant seedlings the sunlight they need to grow. The FEIS, Chapter Vegetation section states, "Because of their relative intolerance to 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, or through cultural treatments (thinning) favoring the species (USDA 1990)."

4-F. Comment:
In the Purpose & Need, the DEIS states that an objective of this project is to restore seral species and restore fire to its historic function. The DEIS also indicates that a forest that is less susceptible to insects and disease is desirable and itself a historic condition. In establishing a big picture view of historical conditions, the DEIS should have established the dominant processes that historically shaped the composition of forests in this area. Some of the processes in this area are fire regime and return interval, annual precipitation, slope, aspect, elevation, and geographic location. The DEIS failed to provide much detail on some of these processes in regards to current conditions and historic conditions.

Response: The current conditions are indeed a direct result of the processes you mention. Chapter 3 contains at least 32 pictures, maps, tables and visual aids describing the forest composition, structure and the activities and processes that have made it what it is today. As explained in the first paragraph of Chapter 3, still more information is available at the Interior Columbia Basin Assessment's website http://www.icbemp.gov.

Various ecosystem processes are discussed in the FEIS on the following pages.

1-12	watershed & wildlife
1-16	policies and regulations
2-6	wildlife
2-13	proposed action
3-1	vegetation, fire-related disturbances
3-4	erosion, fire-related disturbances
3-16	slope and elevation
3-18	forest composition
3-26	forest habitat types
3-36, 3-38	watershed characterization
3-42	fisheries habitat
3-44, 3-50	watershed & erosion
3-50, 3-51	fisheries habitat
3-48, 3-49	watershed existing condition
4-5 - 4-8	forest composition
4-13	fire
4-34	watershed and erosion
4-52	wildlife

4-G. Comment:
The DEIS discusses how the project area might have been under Pre-settlement conditions. How far back in time does the historic evidence span~ lOO years or 2000 years?

Response: Chapter 3 is tiered to larger landscape scale documents such as the Interior Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (ICBEMP). ICBEMP uses 200 years (Scientific Assessment pg 54, 61). Site-specific data in the project area dates back to about the year 1640 (FEIS 3-19).

4-H. Comment:
In promoting this stand conversion, we argue that the FS is not managing the landscape on a sustainable, long-term basis. By promoting the values of shade intolerant, early seral species, the FS leads the public to believe that this project will maintain early seral species in this watershed, however that is impossible (naturally) due to the nature of forest succession and disturbance processes. It also may not reflect the natural diversity of the landscape. The FEIS completely ignores these considerations, which are critical to the cumulative analysis of this project.

Response: Chapter 3 is tiered to larger landscape scale documents such as the Interior Scientific Assessment for Ecosystem Management in the Interior Columbia Basin, which explains landscape ecology, diversity and ecosystem management options. The ICBEMP discussion in on pages 1-5, 1-6. Changes in the ecosystem with respect to HRV are on 1-7. Risks to resources in the project area are discussed on 1-9 thru 1-12. Track the effects to the resources in Chapter 4.

As far as the FS ignoring diversity on the landscape, refer to the FEIS on 3-1: "The analysis area is made up of ever-changing, dynamics ecosystems; "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". These sentences acknowledge diversity on the first page of Chapter 3. The rest of the Chapter explains how, why and where the various diverse forest types are located in the project area. The restoration treatments described in Chapter 2 are designed to maintain the role of fire and stand diversity on the landscape.

4-I. Comment:
How does this artificial stand conversion affect the ecosystem components beyond forest structural stage both locally and across the landscape) both in the short- and long-term? What are the effects of stand conversion to wildlife habitat, hydrological processes, water temperature, riparian integrity, soil microorganisms, soil temperature, genetic diversity, bryophyte populations, ecological integrity, nutrient cycling processes, etc., both in the short- and long-term?
Response: NEPA requires the use of principle, or alternative-driving, issues to streamline analysis and complexity that are part of environmental analysis. From page 1-1 in the FEIS: 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 CRF 1500(b) and (c)). Chapter 2 of the FEIS describes the Principle Issue indicators. Concerns can be tracked through the indicators on Tables 2-1, 2, 3, 4 and 14 and in Appendix A. Effects to alternative-driving issues and principle issue indicators are explained in Chapter 4. Mitigation to avoid or minimize effects to a concern are included in the Required Design Criteria.

Effects to wildlife are summarized in the Conclusions for each species analyzed in detail. See FEIS pages 4-58, 4-61, 4-65, 4-69, 4-70, 4-75, 4-79, 4-83, 4-86. Effects to aquatics are summarized on FEIS pages 4-34 thru 4-51. Soils are discussed on FEIS pages 2-12, 2-13, 2-46, 2-47, 2-49, 2-51 thru 2-55, 2-61; 3-4, 3-15, 3-18, 3-33 thru 3-36, 3-43, 3-50; 4-15, 4-39, 4-41, 4-46, 4-92, and 4-93. Sensitive plant analysis is documented in the Botanist's Sensitive Species Biological Evaluation, and surveys are located in the project file.

4-J. Comment:
The DEIS also fails to adequately disclose the effects and long-term effectiveness of using logging as a restoration tool and as a mechanism to replace fire.

Response: The proposed action is directed by the IPNF Forest Plan, which includes using logging and fire as tools to restore vegetation components in a forest environment. Refer to Alternative 7 (FEIS 2-11) for rationale explaining why silvicultural restoration treatments are essential to reduce forest fuels before any prescribed burning may take place. Also in the FEIS on page 4-94, refer to the discussion on short-term uses and long-term productivity to various resources.

4-K. Comment:
The DEIS fails to acknowledge that the replacement of western white pine by Douglas-fir and grand fir as seral species following disturbance accelerates succession to climax species (Smith & Fischer, 1997). In an area lacking in old growth, this may be an important consideration for retaining stands of Douglas fir and grand fir. Relating to this, the DEIS fails to recognize that conditions other than historic may need to be maintained in order to provide essential habitat for at-risk wildlife or to protect downstream watersheds until such time as suitable habitat can be restored more broadly on the landscape (Wisdom et al., 2000; ICBEMP, 2000).

Response: Graphs depicting the loss of seral species and an increase in shade tolerant species are located in the FEIS (Vegetation Section). There are numerous graphs that clearly illustrate a trend commonly known as forest succession; the associated implications to the project area ecosystem are explained in detail throughout Chapters 3 and 4. With regards to old growth, please refer to the FEIS pages 4-32 and 4-33 where it says the project area meets old growth standards and that there will be no net loss in old growth.

4-L. Comment:
The DEIS does not justify its claims that the vegetation is outside any naturally functioning range of conditions. It allegedly focuses static conditions, however cites to the data that would justify any claims that the "HRV" defines ecosystem functioning as somehow out of balance are missing. The Forest Service (FS) lacks the data to be able to fully understand HRV. Instead of static conditions, the DEIS would better focus on the various natural processes that define ecosystem functioning.

Response: Chapter 3 is tiered to larger landscape scale documents including the Scientific Assessment for Ecosystem Management in the Interior Columbia Basin, which explains the context and role of disturbances, diversity and ecosystem management options. The FEIS uses Historical Range of Variability (HRV) within the context of a dynamic ever changing ecosystem such as on page 3-1 in the FEIS:

> "The analysis area is made up of ever-changing, dynamics ecosystems; ... "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".

The rest of Chapter 3 explains how, why, and where the various forest types in the project area relate to the HRV across the project area. Whether one agrees with the concept or not, use of the HRV system is based on the latest science to measure ecosystem trends and changes overtime. As required by NEPA, site-specific data was used to compare and contrast ecosystem trends regarding HRV and disturbances in the project area. Maps, photos and figures are used throughout Chapter 3 in the FEIS (pages 3-8, 3-9, 3-13, 3-18, 3-19, 3-20, 3-21, 3-24, 3-25, 3-26, 3-28, 3-29, 3-30, 3-31).

4-M. Comment:
The DEIS has all these photos of the Northwest Peak Fire, probably to propagandize the public into accepting logging as some sort of solution to fire risk. However, the DEIS fails to disclose how IPNF management such as the logging proposed for Mission Brush is similar to the management in the Myrtle Creek fire area, which resulted in that municipal watershed being damaged. We incorporate the Lands Council's website: http//: www.landscouncil.org/ fwatch/ myrtlecreekfire.html as comments on this DEIS.

Response: The photos and captions used in the DEIS (3-2 through 4) illustrate a) lethal, b) non-lethal, and c) mixed severity fires so that readers may understand *basic* fire vocabulary and see how these types of fires affect a forested ecosystem. These pictures were the most recent and most site-specific photos available at the time.

The Idaho Panhandle National Forests has previously responded to The Lands Council website and earlier comments on the Myrtle Creek Fire. That information is available at http://www.fs.fed.us/ipnf/admin/press/myrtle_fire_info.pdf

4-N. Comment:
The FEIS fails to disclose the array of adverse ecosystem impacts that have been caused landscape- or forest-wide by fire fighting activities, such as those illustrated on p. 3-6.

Response: The FEIS goes to great length explaining the array of adverse ecosystem impacts that have been caused landscape or forest-wide by fire fighting activities. The FEIS vegetation section of Chapters 3 and 4 illustrate the effects of fire suppression and explains how it has contributed to a major species shift across the landscape from seral to climax species in relation to the forest composition and structure, departure from HRV, and

the rising threat of large scale stand replacement fires. Again, these vegetation trends are one of the reasons for proposing the project.

4-O. Comment:
The FEIS fails to give adequate consideration to the fact that fuels and fuel accumulation are natural processes of forests, especially moist site, multiple species forests. By such failure, the FEIS fails to provide necessary information about the benefits of dead wood, fuels, and dense forests to wildlife and soils and instead takes a minimalist approach towards this ecosystem component.

Response: Fuels and fuel accumulation are an integral part of the driving issues (i.e. forest composition, structure, risk of stand-replacing fire) explained in the FEIS on 2-3. Fuel accumulation by itself was not considered an issue that would be key to development of alternatives. As required by NEPA, to display the clear choice between alternatives, only alternative-driving issues were analyzed in detail. Mitigations for the treatment of fuel accumulations, such as the quantity of `woody debris to be left on site for nutrient cycling, are listed in Chapter 2 or addressed in Appendix A.

Effects to wildlife and their specific habitats are summarized in the Conclusions for each species analyzed in detail. See pages 4-58, 4-61, 4-65, 4-69, 4-70, 4-75, 4-79, 4-83, and 4-86.

Fuel buildup and the need to treat fuels in some manner are discussed on pages 2-12, 2-13, 2-46, 2-47, 2-49, 2-51 thru 2-55, 2-61; 3-4, 3-15, 3-18, 3-33 thru 3-36, 3-43, 3-50, 4-2, 4-4 -4-6, 4-10, 4-15 - 4-17, 4-21, 4-29, 4-31 – 4-33, 4-56, 4-62, 4-63, 4-66, 4-70, 4-80, 4-83, 4-86, 4-87, and 4-95.

5 - Fire

5-A. Comment:
The following sentence is found on page 3- 7. "Since 1944, 49 lightning-caused fires have been recorded in the project area, all but one of them fire surpassed five acres." The word "fire" does not appear correct. The second sentence on this page stated. "The majority of fires during this period were less than one acre because of aggressive suppression action." The amount of acres described does not appear correct. The FEIS needs to clarify the language on page 3- 7. The fire analysis in the FEIS also needs to supply data regarding the number of fires that have taken place in the Moist Forests and Cold Forests since 1800.

Response: Thank you for pointing out the error. Indeed the word "fire" is not correct. The final two sentences on the bottom of DEIS 3-7 should be combined as follows. "Since 1944, 49 lighting-caused fires have been recorded in the project area, all but one surpassed five acres".

Refer to the FEIS figure 3-9 for a map and approximate acres of the fire events in the project area. The Forest Service data indicates the 1890's fire in Mission Creek totals about 16,000 acres.

5-B. Comment:
The Forest Service information is contradictory in the fire behavior analysis relevant to the logging treatments and wind. Many of the drier stands in the Mission Brush Project Area would sustain a crown fire at wind speeds ranging from approximately 12 to 30 miles per hour. Russell et al. (1999) discuss how "in a dense stand the 20-foot wind speed must exceed 50 miles per hour for mid-flame wind speeds to reach 5 miles per hour within a dense stand (0.1 adjustment factor). In contrast, in an open stand (0.3 adjustment factor), the same mid-flame wind speeds would occur at only a 16-mile-per-hour wind at 20 feet" (pg. 11). The open stand landscape is what the Mission Brush Project is aiming to achieve and therefore increasing the risk of fire. Why is this not being discussed or analyzed?

Response: The FEIS discusses fire risk and expected fire behavior in the vegetation sections of Chapter 3 and 4 of the FEIS. As you point out, wind speed is important to fire spread, however, the ladder fuels common in the project area have the potential to propagate a self-sustaining crown fire that creates its own wind. The SIMPPLLE model used to calculate the risk of stand-replacing fire (FEIS 3-32) accounts for the openness or density of timber stands, as well as the density of neighboring stands which can be affected by fire spread. The analysis also used the Forest Vegetation Simulator to simulate wildfire conditions for each alternative (FEIS, Chapter 4 – Vegetation section – issue = Risk of Stand replacing Fire).

5-C. Comment:
The FEIS has not clearly defined what is a Single Pollutant/Day nor do Tables 4-2 to 4-4 aid the reader to understand clearly what this term means.

Response: As discussed on 4-21, smoke emissions from fires contain particulate matter, which are considered a pollutant by the EPA (*Pollutants* (pollution) -- unwanted chemicals or other materials found in the air. Pollutants can harm health, the environment and property. Many air pollutants occur as gases or vapors, but some are very tiny solid particles: dust, smoke or soot). Particulates in the smoke are measured in tons, the threshold issued by the EPA for any single pollutant (in this case particulate matter, is 100 tons per day).

6 - Soils

6-A. Comment:
The FEIS completely fails to fully, or even partially analysis current soil conditions and cumulative effects of the activities proposed in each alternative. A full "hard-.on the ground-look" analysis must be completed before the completion of the FEIS, and the results incorporated into the document.

The FEIS fails to demonstrate consistency with Forest Plan or Regional soil quality standards and fails to cite results of monitoring indicating it has adequately maintained soil productivity while implementing the Forest Plan,

Application of Forest Plan Standards for soils protections requires direct, on-the ground surveys in areas affected by previous management activities in order to provide numerical percentages of existing detrimentally disturbed Activity Areas. Without taking this step, decisions resulting in any soil impacts will be made lacking the cumulative effects analysis that NEPA requires.

The District still seems confused about how to conduct a proper soil analysis. The FEIS states that only Unit 16 fails to meet Region-l soil standards because some of the old skid trails are too close and some rutting has occurred. Also, in order to prevent impact on the soil resource the FEIS proposes that Units 57 and 62 would be treated in the winter and the equipment would operate on snow, or frozen ground, or a slash (FEIS pg. 2-49). Great, but what about the other 49 logging units ? We contend that the analysis of the Mission Brush project failed to look comprehensively at the effects of the project on soils from logging. The only reference to any potential disturbance to soils "would likely be small, localized areas of sterilized soils where severe burning occurs, such as slash piles" (FEIS pg. 4- 78). Nor is there any other current or future projects analyzed or referred to, making the FEIS's soil analysis fall far short of that required by NEPA and NFMA. Also, very little information appears in the FEIS about private activities in the project, a major and serious omission. These activities fall under NEPA's language of reasonably foreseeable future actions and NFMA's language mandating for soil protection and using high quality information and accurate scientific analysis.

What are the soil current soil conditions in the project area?

What are the potassium levels?

What is the compaction percent of the Mission Creek and Gold Creek areas from logging in the)1950, 1960's, 1970's, 1980's and 1990's? Does that figure meet FSM guidelines and IPNF Forest Plan Standards? And will soil compaction from heavy machinery further compact existing conditions?

What are the mitigation measures that are designed to meet these guidelines? What mitigation measures will be undertaken to prevent impacts on the soils?

How was your field surveys" done? Where were they done? How many were done?

Response: This project analyzed soils in the proposed units within the Mission and Brush Creek watersheds. Soils in the Gold Creek drainage were not examined with this project because that watershed is located on the Sandpoint Ranger District *more than 55 miles south of the project area*.

All of the proposed units were subjected to "hard--on the ground--look" field surveys (project file) used techniques outlined in the Region One Soil Quality Standards that you referred to. Only one proposed treatment area, Unit 16, surpassed the soil standard of 15% due to rutting. Full disclosure to the public is located in the FEIS on page 2-49, under item c), “All proposed units except Unit 16, meet Region One soil standards”.

Past Forest Plan Monitoring and Evaluation reports (1990 to present) indicate skyline and helicopter logging increases detrimental compaction by an average of 2%, and winter tractor skidding over snow averages less than 5%, which are well below the Region One standard of 15%. Unit 16 will be monitored before and after the skid trails are improved and trended toward R-1 soil standards.

In areas that have pre-existing skid trails, the trail systems would be re-used so no that additional (cumulative) detrimental impacts to the soil resource is expected. In units lacking an existing skid trail system; mitigation measures indicate any new skid trails must average 100 feet apart except where terrain dictates otherwise FEIS (page 2-47) and (Niehoff, 2002).

Potassium limited soils are located primarily on the west face of Hall Mtn. (project file). Research has shown that leaving slash on site over a winter allows most of the nutrients to leach back into the soil (Bruna, 1994). Pages 2-19 and 2-51 of the FEIS explain the future underburning and nutrient cycling. Refer to FEIS 4-28, 4-29 also discuss reasonably foreseeable actions. Further discussion related to the soil resources are found on pages 2-12, 2-13, 2-46, 2-47, 2-49, 2-51 thru 2-55, 2-61; 3-4, 3-15, 3-18, 3-33 thru 3-36, 3-43, 3-50; 4-15, 4-39, 4-41, 4-46, 4-92, 4-93, C-8, and the project file.

The following table illustrates the results of a soil survey for the Mission Brush FEIS -Alternative 2 (Project File).

Table RC-1 Proposed Treatment Units Soil Survey – Alternative 2

Unit	Unit Size (Acres)	Harvest System	Percent Existing Detrimental Compaction	Percent Additional Detrimental Compaction After Treatment	Percent Cumulative Detrimental Compaction	Percent Regional Soil Quality Standards
1	37	T	8	0	8	< 15
2	12	T	7	0	7	< 15
3	9	S	0	1	1	< 15
4	52	T	4	2	6	< 15
6	114	T/S/H	3	2	5	< 15
7	34	T	6	4	10	< 15
8	232	T/S	9	2	11	< 15
9	67	T	5	2	7	< 15
10	28	T	4	1	5	< 15
11	61	T	3	3	6	< 15
12	14	S	0	1	1	< 15
13	20	T	6	2	8	< 15
14	51	T/S	10	3	13	< 15
15	6	T	0	2	2	< 15
16	**34**	**T/S**	**16**	**0**	**16**	**Rehab.**
17	9	T	11	2	13	< 15
19	67	T	0	8	8	< 15
20	26	T	12	2	14	< 15
22	30	S	3	2	5	< 15
23	63	T	2	4	6	< 15
24	12	S	0	2	2	< 15
26	34	H	1	0	1	< 15
27	176	H	9	0	9	< 15
28	114	H	3	0	3	< 15
29	29	H	2	0	2	< 15
30	507	H	4	0	4	< 15
31	22	H	1	0	1	< 15
32	83	H	2	0	2	< 15
33	125	S	0	3	3	< 15
38	132	T	2	6	8	< 15
41	75	H	0	0	0	< 15
44	20	T	2	4	6	< 15
48	324	S/T	8	2	10	< 15
53	20	T	10	2	12	< 15
57	39	T	0	4	4	< 15
58	48	S	0	1	1	< 15
59	46	S	0	1	1	< 15

60	133	H	2	0	2	< 15
61	87	H	8	0	8	< 15
62	30	S	1	1	2	< 15
63	27	S	2	1	3	< 15
66	52	S	4	1	5	< 15
69	46	H	0	0	0	< 15
111	51	S	0	1	1	< 15
112	30	T	0	6	6	< 15
122	256	T	12	2	14	< 15
125	123	T	5	2	7	< 15
129	86	T	6	3	9	< 15
134	86	T	11	0	11	< 15
135	39	T/S	10	2	12	< 15
140	244	S/T/H	4	2	6	< 15
Ecosystem Burns	238	No ground based equipment will be used. Prescribed burning will only take place when the soil moisture meets the prescription; therefore no detrimental soil disturbance is anticipated.				
H = Helicopter **S =** Skyline (Cable) **T =** Tractor						

6-B. Comment:
We also note that the roads, skid trails and helicopter landings that lace the area are not to be included in the analysis. The failure to disclose this information about the site-specific condition of the soils violates the Idaho Panhandle Forest Plan. How many new helicopter landings spots are being proposed? How many old helicopter landings spots will be used?

Response: Road proposals are shown in figures 2-8. Aquatics discussions of the existing road conditions are found on pages 3-42 through 3-50, 4-34 and 4-35 and Appendix B page B-30. Wildlife discussions are included on pages 3-57 thru 3-61. The recreation sections of Chapters 3 and 4 also talk about roads, skid trails and other parts of the transportation network. The use of helicopters is included in the Chapter 2 alternative descriptions. The existing roads and landings are part of the current conditions described in the FEIS on 2-68 through 71.

The Regional Soil Quality standards, revised in November 1999, specify that 85% of an activity area or unit - **not** including existing permanent roads and landings, "must have" soil that is in satisfactory and productive condition. Helicopter landings are usually located in old landing areas or on road turnouts that are part of the dedicated transportation system and therefore not subject to soil compaction standards. Depending on logistics, helicopter landings are sometimes located on private land and not part of the soil analysis.

6-C. Comment:
Contrary to the DEIS's claim that tree tops will not be yarded in order to "avoid removing soil nutrients from the harvested site", 1,504 acres within 12 units (units 26, 27, 28, 29, 30, 31, 32, 41, 60, 61 and 140) are slated for helicopter logging, treetops will be removed from units adjacent to private land to reduce the buildup of slash and fuel loading (pg. 2-52): "helicopter logging systems, treetops will be removed to reduce fuels" (pg. 2-27), "in areas with helicopter logging systems, treetops will be removed with the last log to reduce fuels" (pg. .2-37) and "yarding tops with helicopter" (Table 4-5). Which of the 12 units are adjacent to private lands?

Response: Refer to DEIS page 2-52, “Tops will not be yarded, except in portions of helicopter units adjacent private land to reduce the buildup of slash and fuel loading”. The next sentence starting with ”*The purpose of the measure*….” Should be deleted as an error.

"Portions of the helicopter units" includes the western edges of Units 30 – 32 where the anticipated activity fuel loading will be high in places next to private property lines and should be reduced before prescribed burning can take place (see Fig 2-2). Enough slash will be left to meet coarse woody debris guidelines as stated on page 2-50 - 53. Potassium limited soils are located primarily on the west face of Hall Mtn (project file). Research has shown that leaving slash on site over a winter allows most of the nutrients to leach out back to the site (Bruna, 1994).

7 - Openings

7-A. Comment:
We ask the Forest Service to explain in the subsequent DEIS why such excessive clear cuts, which require Regional Forester approval and public comment are being proposed for this "integral part to ecosystem restoration in the project Area".

Response: There is a single 15-acre clearcut (a future seed orchard) proposed in Unit 134.
The desired future conditions in our forest are described in the FEIS on pages 1-9 through 1-12. Treating areas that result in openings larger than 40-acres in size would create stands more in line with historic conditions regarding fire intervals, patch size, landscape fragmentation levels and shape considerations. All of the proposed units are designed to fit the landscape with no construction of permanent roads, and to meet the project's objectives.

The IDT considered not using regeneration cuts to create openings larger than 40 acres, however, it was dropped from detailed analysis (project file). Openings less than forty acres do not lend themselves to landscape ecosystem management styles for many reasons:

- Smaller openings would not sufficiently address the scale of current vegetation problems (2600 plus acres at high to moderate risk of insect / disease mortality) scattered across the project area at a landscape level, or adequately meet the purpose and need.
- Smaller openings spread across the landscape would fragment large blocks of forest habitat and would not help promote historic patch sizes.
- More full bench "mid-slope" roads would be needed to access most of the smaller proposed Units, resulting in impacts that could adversely affect aquatics.
- Visual resource impacts of smaller openings over a more extensive area can be greater than large openings of similar structure.
- Smaller openings would not effectively reduce fuel loading on the scale described in the purpose and need.
- Many stands proposed for regeneration harvest are experiencing high mortality, and are expected to continue with this level of mortality in the future.

In order to meet the Forest Plan Visual Quality Objectives, or the newly adopted Scenic Integrity Objectives, the unit boundaries should tie into existing old regeneration units (to eliminate or absorb the old geometric shapes), follow geographic features as much as possible, and leave reserve trees in irregular clumps and stringers (visual report – project file). These openings will be considered "recovered" by the wildlife and aquatic resources in 15 to 25 years depending on the habitat type. These new openings and their effects have been incorporated into the watershed, wildlife, fire, and visual analysis (DEIS and FEIS on page 2-22).

8 - Insect and Disease

8-A. Comment:
The Forest Service needs to adequately disclose that the logging methods proposed may increase the risk of prolonging current Douglas-fir beetle, dwarf mistletoe outbreak and increase the incidence of Annosus (fomes annosus) and Armillariamellea root diseases. The Forest Service needs to adequately disclose that silvicultural and direct control responses to insect outbreaks and root rot diseases are often considered controversial and disputed by the community of experts and scientists.

The FEIS only states that "dwarf mistletoe species that are widespread in the analysis area are specie-specific to their host tree-larch and Douglas-fir" (FEIS pg. 3-12).
What logging methods will be used?
What tree species will be targeted for removal?
What are the major causes of Annosus Armillaria mellea root rot, dwarf mistletoe, douglas-fir bark beetle, laminated root rot occurrences in the project area?

Response: The Forest Plan gives land managers direction to manage forest resources to protect against insect and disease damage (FEIS Chapter Three – Vegetation section) lists the major trends across the landscape and recommendations to correct the overcrowded stand conditions and the species distribution that has departed away from historical values. The effects of fire exclusion and substantially declining forest health as indicated by the increased in root diseases, insect attacks and mortality are a direct effect of overcrowding and fire suppression as described in Chapter 3. The proposed restoration treatments are described in table format by alternative in Chapter 2 of the FEIS.

Over 2600 acres of timber stands in the project area are currently at a moderate to high risk of mortality from bark beetles (project file). Alternatives 2, 3 and 4 would treat approximately 870, 720, and 560 acres (respectively) of the moderate to high risk stands of timber. The silvicultural treatments and logging methods are design to create fire-, insect- and disease- resilient stand conditions in both the short and long term. The treatments are listed by alternative in table format in Chapter 2 of the FEIS.

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9 - Roads

9-A. Comment:
The EIS does not describe how many years these temporary roads might be in place. Given the increased flexibility in timber contracts, these roads and stream crossings might be in place for several years and some 'atypical' high-risk roads may be present in degraded watersheds for up to a decade. Also, given the extremely poor success rate the Forest Service has regarding enforcing road closures, it is likely that user-created resource damage will continue to occur into the foreseeable future.

We strongly disagree with the creation of up to five "miles of "temporary" roads in the project area as stated in preferred Alternative 2 and Alternative 4. Research shows that once "temporary" roads are installed, they become a permanent part of the forested landscape.

Response: The temporary road construction involves opening about 2.5 miles of existing, but currently undriveable roads and actually constructing about 2.5 miles of new, temporary roads. All of these temporary roads will be decommissioned after timber harvest, related activities such as fuels treatments, any associated tree planting or other sale-related activities are completed. The length of time they will be in the forest is estimated at five to eight years (FEIS, page 2-49.) To avoid potential resource damage, all construction of temporary roads generally longer than 300 feet would be designed by a Forest Service Engineer and construction would be monitored by an engineering representative (FEIS, pages 2-549, 2-53.) Decommissioning techniques and their effectiveness are discussed on page 2-49 of the FEIS.

9-B. Comment:
The extremely high road density throughout the analysis area is a serious limiting factor for quality wildlife habitat. The proposed project definitely attempts to deal with this problem, but not in the full extent that we would like you to.

We strongly feel that there should be no new roads created in this project, as stated in Alternative 3. We believe that if the Idaho Panhandle NF is truly committed to protecting this area for wildlife you will remove these roads, and preclude the future use of these roads for even administrative use.

Response: The Forest Service is a multiple use organization and the roads are needed for various uses. The transportation network in the Mission Brush project area often access private lands and some of the roads are "cost-share" roads, which means they are not solely owned by the USFS. Road density and effects to various wildlife species is discussed on pages 3-59, 4-54, 4-58, 4-59, 4-60, 4-61, and Appendix B pages B-4, B-9, B-11 and B-12. These will be no net increase in open road miles in Canada lynx habitat (FEIS, page 4-58.) Nor will there be any increase in road miles in the grizzly bear use area (FEIS, 4-61.)

9-C. Comment:
We applaud the Forest Service for stating that "roughly 13 miles of road proposed to be decommissioned, " However we would like to see even stronger language stating that the miles of road to be decommissioned will actually be removed after decommissioning.

Response: "Decommissioning," by definition, is the removal of roads from the landscape and the Forest Service road inventory. Roads that are to be made undriveable, but are to remain on the landscape, are referred to as "stored" or "put into storage." A map of the roads to be stored, decommissioned or remain open is on 2-64.

9-D. Comment:
Again, we reiterate, we would like to see no temporary roads built in this project. We question the fact that there are up to 39 miles of roads that need to be maintained/improved." I realize that the majority of these are being maintained/improved" in order to protect water quality, safety issues and other related needs. But, we wonder if all these roads are needed 'and many could instead be removed. The road density of this area must be brought down to a more reasonable level if we expect this area to serve a purpose for wildlife.

Response: The 39 miles of roads to be maintained/improved are designated haul routes for project activities. A "roads analysis" was completed for this project in order to prioritize road improvement, obliteration or storage needs. The analysis also determined which routes are needed long-term and those that would be short-term (temporary) needs within the project area. Details are in the project file.

9-E. Comment:
The proposed re-alignment project of U.S. 95 (DEIS Figure 4-11) will have major permanent impacts within the project area for the FEIS. Our primary areas of concern are impacts on wildlife, their migration routes and the introduction of invasive species into areas previously uninfested.

Response: The realignment of U.S. Highway 95 was included in the DEIS as a Reasonably Foreseeable Action for analysis of resources, where appropriate. Migration routes for big game will be maintained using underpass structures. Specific information is included in the Idaho Department of Transportation (IDOT) Environmental Assessment (EA) dated 5/21/01. Chapter 4 of the IDOT EA explains how the design and construction includes big game crossings/underpasses as part of the realignment project. The construction project also provides funding for improvement of big game winter range in the area.

The Mission Brush FEIS contains pertinent information on pages 1-15, 4-29, 4-30, 4-34, 4-35, 4-46, 4-64, 4-67, 4-69, 4-75, 4-78, 4-82, and 4-85. Appendix B contains information on pages B-12, B-21, B-24, B-33, and B-36.

The realignment resulted in the loss of prime big-game winter habitat, for which funds were allocated by ITD/Federal Highway Administration to provide mitigation measures. Most historic winter range in this area is already gone, having been converted to agricultural uses over a century ago. The "migration" route to this historic range was disrupted through the original construction of and subsequent improvements to Highway 95. Since the "migration" route is already blocked, it is extremely unlikely that the Mission Brush project will have measurable impacts to wildlife movement corridors.

This comment should have been submitted to ITD during the public comment period for the U.S. Highway 95 realignment proposal.

The Mission Brush FEIS mitigates the spread of noxious weeds in the proposed units by washing logging equipment and spraying weeds as explained in the FEIS Chapter 2 mitigation, and in A-1. The Idaho Transportation Department EA (Chapter 4) explains how the construction project will mitigate for weeds.

10 - Recreation and ATV / Off Road Vehicle Use

10-A. Comment:
While the goals of improving rustic features around Brush Lake may be well intended, the failure to address unrestrained Off Highway Vehicle (OHV) use will negate any improvements. Under Environmental Consequences (p. 4-78), the EIS states that, "There will be vastly increased opportunity for cross-country motorized use. Resulting damage could be significant." The EIS takes no action to amend this unacceptable consequence.

The EIS needs to describe how the Forest Service will effectively monitor and control the use of OHVs on Forest Service roads, obliterated roads, and trails in the project area. The EIS should include funding and numbers of personnel available for these duties. The EIS also fails to consider how increased snowmobile use will affect wildlife, particularly wolverines. Regarding recreational use of Brush Lake, we are concerned that boats will introduce alien aquatic species such as the New Zealand mud snail, Eurasian milfoil, zebra mussel, and purple loosestrife.

Response: As explained in the FEIS, ATV use is increasing and will continue to increase. At this time, there are no designated ATV trails in the analysis area. The ID Team recognizes the potential for ATV damage to resources and is proactively designating trails and areas for ATV users to ride in locations that minimize any potential resource damage. Refer to FEIS on 2-13, “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 2-2)”. This means that ATV users are restricted to well marked trail networks and road systems in a designated recreation area, or they could be fined for the violation(s).

Monitoring is part of the Forest Plan (1987) and will be continuous through feed back from various Forest Service employees that visit the area weekly to maintain campground facilities, spray weeds etc. Experience with the local Stampede Lake ATV trail network since 1995 has shown that ATV user groups are generally self-policing, eager to help with maintaining the trail network, and regard the ATV area as an asset to the community (Personal Comm. P. Hart, Bonners Ferry R.D. Recreation Tech.).

- See FEIS pages 1-5, 2-14, 15, 16 for the recreation goals and maps of ATV closure/open areas.
- The FEIS recognizes the demand / tradeoffs with ATV use on page 2-16, 4-44, 4-47, 4-73, 4-88, 4-89, and 4-91.
- Signs warning boaters of your concerns have been in place at the boat launch for a few years. Monitoring for mussels and alien aquatic vegetation is done by the State of Idaho.
- The FEIS recognizes the human / wolverine factor on page B-8.
  The FEIS explains that potential displacement by winter recreational activities would not be a factor, since enhanced off-road recreational opportunities would occur in the developed portion of the project area, where wolverine presence is untenable or undesirable. The undeveloped area to the east of the project area is an unattractive destination for snowmobilers due to the high percentage of dense canopy cover forest, and currently receives a low level of snowmobile use – mostly along existing roads on the northern and eastern periphery. Snowmobile access to this area is mainly from Hellroaring Creek to the north. The proposed recreational developments in the Brush Lake area would not noticeably improve snowmobile access to this area. As stated in the FEIS, no measurable impacts to wolverines are expected.

11 - Finances

11-A. Comment:
The Table 2-14 on page 2- 72 lists estimated "restoration benefits" in dollar amounts for each Action Alternative. The discussion on page 4-24 also uses the term "restoration" when the estimated costs and timber sale receipts for each Action Alternative are listed.
The term "restoration benefits" implies there could be as much as $3.5 million dollars of restoration work. The use of the term "restoration" is misleading when underburning and reforestation expenses for Alternative 2 would exceed $2,898,000.00. There are an additional $111,000 in expenses listed in order to burn piles, $25,000 for slashing, along with over 396,000 in expenses a purchaser will have to include when bidding on a timber sale.

The FEIS needs to supply high quality information that accurately describes the expected receipts that would be left over for watershed or fisheries habitat restoration work after all reforestation and administrative expenses are fully accounted for in the event one or more timber sales sell for a minimum bid.

Response: Whether or not one or more of the timber sales were to sell for a minimum bid, the costs for the required aquatic habitat improvements listed in Chapter 2 of the FEIS, are integrated into the contract package that provides for improvements for the haul routes accessing the timber sales. The road package design includes features to reduce sediment delivery in to the aquatic system. See Chapter 2 - Required Design Criteria and Mitigation Measures, and the Economics section in A-3.

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12 - Wildlife

Grizzly Bear

12-A. Comment:
Based on the limited information presented in the DEIS and prior to completing a Biological Assessment (EA), the Specialist has concluded that the project 'May affect, but is not likely to adversely affect' (NLAA) grizzly bears. This finding is premature. In order to reach a finding that the project is NLAA grizzly bears, a BA must be prepared which considers cumulative effects, potential for increased mortality risk and "take" due to existing conditions and actions associated with the project.

The FS needs to provide a Biological Assessment with full consultation from the US Fish and Wildlife Service before the Mission Brush Project proceeds any further.

Response: A Biological Assessment (Project File) was prepared and submitted to USFWS. In the letter dated April 9, 2004, the USFWS indicated that they had reviewed the information provided and concurred with our determination of “may affect, but are not likely to adversely affect” grizzly bear and Canada lynx (FWS Ref. 1-9-04-I-143) contingent upon implementation of the project and conservation measures in the BA.

12-B. Comment:
The Mission Brush FEIS states that "open road densities are currently 3.0 mi/sqmi in the bear use area." FEIS at 218. Alternatives 2 and 3 would increase the open road density to 3.1 mi/sqmi as a result of opening 5.5 mi of a currently undriveable road.

Response: Subsequent to the release of the FEIS, the Record of Decision for 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 (USFS 2004) has been published. This decision gives official status to the Deer Ridge Occupancy Area (referred to in the FEIS as the “Deer Ridge Analysis Area”) and to the access management strategy for this area described in the FEIS on page 4-52 and 53 (i.e. – no net increase in open or total road densities). As a result of this decision, and pursuant to discussions with USFWS, the Deer Ridge Occupancy Area has been identified as a suitable cumulative effects analysis area for this particular portion of occupied habitat outside recovery zones (B. Holt, pers. comm.). This replaces the “occupied habitat within project area” used as a cumulative effects area in the FEIS. Consequently, reported road densities for

existing condition and those resulting from various alternatives have been modified to reflect the different cumulative effects analysis area.

There are about 145 miles of drivable roads and motorized trail in the Deer Ridge OA, including 136 miles of open roads. This creates an open road density of 3.12 miles/mile^2. While 5.5 miles of currently undriveable road may be opened in the entire project area, only 0.55 miles of currently undriveable road (RD 2141H) will be utilized within the bear use area under Alternatives 2 and 3 (this road would remain undriveable in Alternative 4). 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 during project activities. 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) during project implementation, as well as some 11.7 miles of undriveable roads. When post-harvest road work is completed, open road densities in the Deer Ridge OA would be reduced to 2.98 miles/mile^2. As stated above, the USFWS concurred with our determination of "may affect, but are not likely to adversely affect" grizzly bear (FWS Ref. 1-9-04-I-143) contingent upon implementation of the project and conservation measures in the BA.

12-C. Comment:
Elsewhere the DEIS states that the open road density is currently 3.04 mi/mi^2 in the 11.5 mi^2 cumulative effects area delineated for assessing impacts on grizzlies as a result of the project. DEIS at 3-59.

Response*:* This figure corresponds to the rounded value of 3.0 mi/mi^2 stated on p. 2-18. Corrected numbers are given in ***B.***, above.

12-D. Comment:
The DEIS also indicates that 5 miles of temporary road would be constructed under alternatives 2 and 4. FEIS at 2-17. Presumably these roads would be open during the timber sale further increasing the open road density in the project area. These miles need to be factored into the calculation for open road density- during the project for alternatives 2 and 4.

Response: The 5 miles of temporary road construction will take place outside the bear use area (see maps, p. 2-20, 2-40, 2-68, 2-69), and so are not factored into road density calculations to measure potential effects to grizzly bears.

12-E. Comment:
The access management criteria in the IPNF BO for the Selkirks and Cabinet-Yaak was based on a 1997 report by Wakkinen and Kasworm that has not been peer-reviewed and relied on a very small sample size to draw its conclusions.

The determination of effects must be based on the best available science.

Response*:* The USFWS has instructed land management agencies to use "local research" specific to affected recovery zones in determining core and road density standards for BMUs. The 1997 Wakkinen and Kasworm report is the only such research conducted in the Selkirk and Cabinet-Yaak Recovery Zones. Questions about the reliability or suitability of the Wakkinen and Kasworm report are outside the scope of this project.

There are no numeric standards for open road density, total road density, or core habitat in occupied areas outside recovery zones, so conclusions drawn from Wakkinen and Kasworm (1997) are not applicable to this project.

12-F. Comment:
As the Forest Service is well aware, Section 9 of the ESA prohibits "take," which includes harm and harassment of threatened and endangered species, regardless of whether they occur outside recovery area boundaries. Based on information in the Mission Brush DEIS we believe the action alternatives have the potential to adversely affect grizzly bears and result in take.

…the current open road density (3.04 mi/mi^2) in the small area being assessed is extremely high and is resulting in take. Reducing it to 2.55 mi/mi^2 will not eliminate take.

Response: The Biological Opinion (BO) for 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 (FWS Ref. 1-9-02-F-148) stated that some level of incidental take of grizzly bears was occurring in identified areas of occupancy outside of - but adjacent to - the Selkirk and Cabinet-Yaak Recovery Zones, but that it was not numerically quantifiable or resulting in direct mortality. The USFWS analyzes for and exempts the existing amount of incidental take occurring in these areas, as long as the Terms and Conditions outlined in the BO (FWS Ref. 1-9-02-F-148) are adhered to (i.e. – no increase in open road densities and no permanent increase in total road densities).

12-G. Comment:
Total Road Densities and Core must be considered:
The IPNF BO states that harm occurs with total road densities of 2 mi/mi^2 in over 26% of BMUs & with core of less than 55% of BMU's. IPNF BO at 59. The FEIS does not include any discussion regarding total road densities or core. Building 5 miles of temporary roads will increase the total road density in the project area. There is no mention in the DEIS of what the current total road density is or how it will be affected by the timber sale. Excessive total road densities and inadequate core, as well as high open road densities, harm grizzly bears and result in take and must be considered in an effects analysis.

The IPNF BO expresses the "...judgment that take...in the form of harm occurs when open road densities exceed one mi/mi^2 in over 33% of a Bear Management Unit." IPNF BO at 59. Grizzly bear studies in the South Fork Flathead determined the maximum percent of a BMU that can exceed 1 mi/mi^2 while avoiding excessive take. As a result, the maximum percent of a BMU that can exceed 1 mi/mi^2 in the Flathead Forest Plan is 19%. As mentioned above, the IPNF BO set the allowable percent of a BMU with an open road density greater than 1 mi/mi^2 is 33%.

Table 4-8 indicates that the Issue indicator for grizzlies is "Changes in Road Densities." DEIS at 4-49. The "issue indicators" for grizzlies should be open and total road densities and available core which must be calculated for before, during and after the timber sale in order to determine whether a take is occurring, or will occur.

Response: The BO being referenced (FWS Ref. 1-9-00-F-1) only addresses BMUs (areas within recovery zones); statements of "harm" and "take" - as well as numeric standards for core, open, and total road densities (55-33-26) - contained in the BO do not apply outside BMUs. The 2004 BO (see F., above) specifies that there be "no increases in linear open road densities" and "no permanent increases in linear total road densities" within designated occupied areas. Since the 0.5 miles of currently undrivable road opened would be gated to prevent public access during project activities, and there would ultimately be a decrease in open and total road densities, the Mission Brush proposed action is consistent with this direction (FEIS p. 4-59, 4-60). The resulting Determination of Effect on grizzly bears has been consulted on and concurred with by USFWS (FWS Ref. 1-9-04-I-143).

As discussed in 12-D. (above), the 5 miles of temporary road construction will take place outside the bear use area in the vicinity of Brush Lake (see maps in Chapter 2 of the FEIS), and so are not factored into road density calculations to measure potential effects to grizzly bears.

The FEIS (p. 4-59) states "While there are several seasonally restricted roads within this area [project area within the bear use area], these roads are only restricted during the big game hunting season, so from the standpoint of grizzly bear habitat they are effectively 'open'. Therefore, there is no difference between reported 'open' and 'total' road densities." Subsequent to the release of the FEIS, the ROD for 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 (USFS 2004) has been published. This decision necessitated a change in the cumulative effects analysis area for this particular portion of occupied habitat outside recovery zones (see H., below). As a result of this change, there are several roads within the cumulative effects area that are gated year-long – resulting in different open and total road densities.

This project includes brushing of 0.55 miles of currently undrivable road (Road 2481H) within the Deer Ridge AA, which would raise the total road density during project implementation from 3.32 miles/mile^2 to 3.34 miles/mile^2. 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) during project implementation, as well as some 11.7 miles of undrivable roads. When post-harvest road work is completed, total road densities in the Deer Ridge AA would be reduced to 3.20 miles/mile^2.

Since core habitat percentages are not calculated for areas outside Recovery Zones, the issue indicator for grizzly bears remains "Changes in Road Densities."

12-H. Comment:

The Cumulative Effects Area is Inadequate:

Because it is outside the grizzly bear RZ, the project area is not in an officially designated BMU. BMUs are the assessment units for grizzly bears. The DEIS proposes using the area occupied by bears in the project area as the assessment unit or cumulative effects area. DEIS at 4-49, Table 4- 7. The proposed cumulative effects area is approximately 11.5 sqmi, or about 1/10th the size of the average BMU in the Cabinet-Yaak and Selkirk RZs. DEIS at 3-59. The only information offered about this proposed cumulative effects area is the current open road density, which is 3.04 mi/mi^2…We submit that the cumulative effects area analyzed for this project should be enlarged to include the entire area known to be "occupied," north as well as south of the border. Logical boundaries would be Highways 95 and 1 to the south and Highway 3 to the north. There is potential for bears to occupy this entire "island" that is surrounded by highways and private land.

When assessing the cumulative effects of proposed actions that are likely to affect transborder bears that are part of or linked to the endangered Selkirk and Cabinet- Yaak grizzly populations, the Forest Service must make an effort to include areas north of the border.

Response: As stated in the FEIS (p. 4-52), the USFS and USFWS have identified and mapped polygons outside grizzly bear recovery areas known to be currently occupied by grizzly bears. The mapped area in the vicinity of the Mission-Brush Project Area is now referred to as the "Deer Ridge Occupancy Area", and contains approximately 27,980 acres (43.72 square miles). Of this, the USFS manages approximately 23,865 acres (37.28 square miles), or around 85% of the analysis area. The USFWS has indicated that this is a suitable cumulative effects analysis area for this particular portion of occupied habitat outside recovery zones (B. Holt, pers. comm.). The final boundaries of the Deer Ridge Occupancy Area are given the FEIS for 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, and in the project file.

Within the 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/mi^2. Across the entire Deer Ridge Occupancy Area, total road density will be 3.34 miles/mile^2 for Alternatives 2 and 3; road densities will remain unchanged for Alternative 4. Once post-sale road decommissioning activities are completed, open road density will be 2.98 miles/mile^2, and total road density will be 3.20 miles/mile^2.

The FEIS (p. 4-52) states that "using a larger area [than the project area/Deer Ridge Occupancy Area overlap] for cumulative effects analysis would only serve to dilute the effects of changing road densities within the project area." It is apparent from the numbers above that calculating road densities across the entire Deer Ridge Occupancy Area effectively obscures the actual effects of project implementation on motorized access, both during and after project activities. A change of 0.02 miles/mile^2 equates to about 32 meters of road within a square mile area – effectively zero. As stated, using a BMU-sized cumulative effects area (~100 square miles) would further dilute project effects.

A reasonably foreseeable activity within the Deer Ridge Occupancy Area that would temporarily increase total road densities is the proposed Northern Prairie project. In 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 both the Mission Brush and Northern Prairie projects could raise total road density in the Deer Ridge Occupancy Area to 3.37 miles/mile^2, although the additional road miles would not be available for travel by the general public. Since newly opened roads would be gated, there would be no increase in open road density during project implementation. Once all project activities are completed, total road density would be 3.08 miles/mile^2, while open road densities would be reduced to 2.86 miles/mile^2.

12-I. Comment:
[Grizzly bear] Occupation is dependent on adequate security being made available through access management.

Response: While research has shown that this is generally the case, repeated sightings of grizzly bears in the occupied portion of the project area, where open road densities exceed 3 miles/mile^2, indicate that grizzlies do occupy the area in question despite the lack of "adequate security".

12-J. Comment:
In spite of known use of the area by grizzlies, neither the DEIS nor the statement from W. Wakkinen indicate that the area north of Highways 95 and 1 and south of Highway 3 is currently considered a viable linkage zone, or that it is being utilized by the Cabinet- Yaak and Selkirk bears as such. However, the fact that bears use the area, along with its location in the relatively narrow strip between the two RZs, indicates that it has a high potential to become a stepping stone between the two populations. This must be considered in the EA and the Final EIS. Furthermore, in its 1999 Administrative Finding that the Cabinet-Yaak and Selkirk populations were warranted for endangered status, the FWS also proposed that the Cabinet-Yaak and Selkirk populations be combined as one distinct population segment (DPS) because of their proximity and evidence that bears use the area between the two ecosystems in north of the border.

Wildlife Migration Corridors:
The future of our wide-ranging species of wildlife like grizzly, Canada lynx and fisher~
depend upon the maintenance of habitat between core habitats, which A WL calls corridors and others call linkages. The analysis area is located within such a linkage and corridor area, and serves as a connection between core areas in the Selkirks, the Purcells, and the Cabinet-Yaak. We do not think that the proposed Alternative #2 adequately protects these corridors, and question if Alternative #4 does either. The cumulative impacts of this whole massive project upon the corridors will inevitably degrade their quality' and ability to be utilized by wildlife. The proposed logging demonstrates how this project will impact secure wildlife habitat and connectivity. Due to all of the management activity it will be a very long time before wildlife utilizes this area again.

Response*:* The Interagency Grizzly Bear Committee (IGBC) is the committee of state, federal, and Canadian agencies working cooperatively to implement the Grizzly Bear Recovery Plan and conserve and recover the grizzly bear in the conterminous United States. The IGBC recognizes Highways 95 and 2 as "Priority Wildlife Linkage Habitat" (refer to 'Draft: Report to the Interagency Grizzly Bear Working Group on Wildlife Linkage Habitat' on IGBC internet site at http://www.fs.fed.us/r1/wildlife/igbc). In a policy statement, IGBC states that "The main factor causing habitat fragmentation is human development, especially when development occurs in a linear fashion…Development in mountain valleys and transportation systems such as highways and railroads are common problems for wildlife." Based on this, we assert that the key threats and barriers to grizzly movement between these recovery zones come not from activities on USFS land, but from activities and structures in the developed portions of valley bottoms adjacent to Highways 95 and 2. In addition, identified connectivity corridors within the project area itself are being protected to assure compliance with Canada lynx habitat management standards; and INFISH guidelines guarantee that riparian areas will be left intact (refer to FEIS p. 4-55). These safeguards will provide habitat connectivity across the project area for a variety of wildlife species, including lynx and grizzly bears.

Canada Lynx

12-K. Comment:
There is no indication whether an extensive survey for lynx has been done throughout the project area, or what population trends are for the lynx in the Mission-Hall LAU and the adjacent geographic area.

Response*:* There have been no credible extensive surveys for lynx in the vicinity of the project area. Long- or short-term population trends – or even presence/absence of individuals – can be difficult to establish for secretive, wide-ranging and low-density predators such as lynx. The USFS assumes lynx presence within the designated lynx recovery zone, and manages lynx habitat according to standards and guidelines outlined in the *Canada Lynx Conservation Assessment and Strategy* (LCAS).

12-L. Comment:
There is a failure to disclose pertinent scientific information surrounding lynx, information regarding the various categories for capable and suitable lynx habitats, impacts of recreation on lynx, and mortality impacts of the proposed action.

Response*:* Summaries of important lynx habitat indicators in the Hall-Mission LAU are given in the FEIS on p. 4-53. A more complete table containing information on existing condition and potential effects on all lynx habitat components was inadvertently left out, and has been added to the FEIS. This project will not result in additional recreation impacts to lynx habitat (see lynx habitat map – project file). Full analysis of impacts of existing recreation – particularly winter recreation – on Canada lynx is outside the scope of this project. The probability of lynx mortality due to project activities is extremely low, and is addressed on p. 4-58 of the FEIS.

12-M. Comment:
A decision to log and increase motorized recreation in lynx habitat without first finalizing Forest Plan amendments for lynx management and without first designating critical habitat makes no sense.

Response: There will be no increase in motorized recreation in lynx habitat. Enhanced motorized recreation opportunities will be confined to the Brush Lake area, which is outside designated Lynx Analysis Units (LAUs) (see lynx habitat map – project file). Designation of critical habitat is the responsibility of the USFWS. The FEIS for the Northern Rockies Lynx Amendment is currently in progress (the FEIS was released in January, 2004). In February, 2000, the USFS entered into an agreement with the USFWS (Lynx Conservation Agreement) that required Federal land management agencies to review and consider recommendations outlined in the Lynx Conservation Assessment and Strategy until a ROD on the Lynx Amendment is signed. This agreement specified that the LCAS would provide the basis for effects determination of ongoing and proposed USFS activities in ESA Section 7 consultation during the interim period.

12-N. Comment:
Despite the vast "new information" on lynx since the release of this DEIS-information that includes a recent court decision on the Revised LCAS and mapping-the Forest failed to go back and re-analyze all of the DEIS's alternatives-or consider new alternatives-in this light. The only new analysis that was provided in the project EA, where only the (eventually) selected alternative was considered. The Forest had obviously already made a decision-before a fair and full analysis was done for all the alternatives, including ones that did not create human disturbance by logging-which is clearly illegal under NEPA.

Response: We are unaware of “new information” on lynx since the release of this DEIS. The recent court decision requiring USFS and USFWS to formally consult on any activity that results in a determination of “may affect, not likely to adversely affect” Canada lynx until USFWS designates critical habitat for the species, has recently been vacated. No additional analysis was done for the proposed action or any other alternative. The “no action” alternative, which by definition does not include logging, was analyzed in detail.

There is no “project EA” for the Mission Brush activities. This statement might have been made in consideration of a different project.

Northern Goshawk

12-O. Comment:
Northern Goshawk
The habitat suitability model used to estimate goshawk habitat overestimates the amount of capable habitat (EIS p. 4-63) .These overestimations make it important to field-verify nesting and post-fledgling areas and protect all existing and alternate nest areas.

Response: The FEIS states that the model overestimates the amount of currently suitable habitat, in the sense that not every acre of a modeled suitable nest stand will be suitable due to microsites that contain dense thickets of trees, steep slopes, etc. However, the model is a good general predictor of suitable nesting habitat, as evidenced by the fact that known nest sites are usually in stands modeled as "suitable". It is not practical to break out stands into <5 acre parcels of suitable or unsuitable habitat and conduct analysis on a landscape scale, so the smallest unit of analysis is an identified stand with unsuitably steep areas (as determined by DEM data) removed (FEIS, p. 4-70). Within the project area, approximately 680 acres of stands identified by the model as "suitable" habitat were field verified – including all suitable stands within proposed treatment units. Field verification confirmed that nearly all modeled "suitable"stands contained at least patches of suitable nesting habitat, but were often interspersed within larger areas of unsuitable nesting habitat. The statement in the FEIS (p. 4-70) merely wishes to convey that not every acre of modeled "suitable" stands is suitable, but that the stand will contain patches of suitable habitat. Similarly, not every acre of a modified "suitable" stand represents loss of nesting habitat, but there will be a loss of nesting habitat when suitable stands are treated.

All known and discovered existing and alternate nest areas will be protected (DEIS p. 2-58).

12-P. Comment:
In analyzing the habitat requirements for goshawks, the EIS fails to distinguish between foraging habitat and nesting habitat. While goshawks can forage more effectively in mature forests with relatively open understories, nest areas require mature forests with dense understories to provide thermal cover and to protect chicks from predation: Studies suggest that the dense vegetation in these stands provide relatively mild and stable micro-environments, as well as protection from predators of goshawks (other goshawks, great-horned owls, red-tailed hawks, coyotes, bobcats, raccoons, humans) (Reynolds et al. 1982, Moore and Henny 1983).

Response: Northern goshawk habitat referred to as "suitable" in the FEIS refers to nesting habitat. Since goshawks have been documented foraging in a variety of habitats, nesting habitat is considered more limiting on the landscape. The IPNF habitat suitability model is structured to identify the nesting component. The assumption is that if adequate nesting habitat exists, the area will meet all goshawk habitat needs.

Information published in the two cited studies discussing structure of goshawk nest sites is not conclusive regarding understory congestion, and is further clouded by the fact that both studies address all North American members of the genus Accipiter. Sharp-shinned and Cooper's hawks typically select nesting stands composed of higher densities of smaller trees than do goshawks, and consequently nest in stands with more understory congestion. While Reynolds et al. (1982, p. 132) report that nests were found in stands with "multilayered canopies with green foliage occuring from a few meters above the ground to over 40 m", they imply that these conditions only account for about 10% of examined nest sites, and state that the majority of nest sites were in old-growth stands that apparently did not meet this condition. Moore and Henny (1983, p. 67) report that within goshawk nest stands: "Crown volumes at lower levels, 0 to 12 m, are generally low while the majority of foliage is in strata from 12 to 24 m. This profile is produced by stands of larger coniferous trees (>16.5 cm dbh) with relatively low understory crown volumes." Published literature makes it clear that goshawks prefer a relatively dense canopy layer above the nest to regulate ambient temperatures and to provide protection from large avian predators (great horned owls and red-tailed hawks), but the same studies do not conclusively state that "nest areas require mature forests with dense understories."

12-Q. Comment:
Alternative 2 would selectively harvest 1,352 acres of suitable habitat and inappropriately remove understory congestion from nest areas. Alternative 2 would use also regeneration harvest across 1,038 acres of suitable habitat.

Response***:*** Alternative 2 would selectively harvest 1,352 acres of **capable** nesting habitat, 244 acres of which are currently suitable. As stated in the FEIS (p. 4-71), suitable nesting habitat treated by selective harvest [244 acres] is likely to retain structure compatible with goshawk nesting. Alternative 2 would regenerate 1,038 acres of **capable** nesting habitat, 155 acres of which are currently suitable. As stated in the FEIS (p. 4-72), suitable habitat treated by regeneration harvest [155 acres] would move out of suitable condition.

12-R. Comment:
The EIS states that this [Alternative 2] may enhance foraging conditions on the periphery of these units, but fails to calculate the actual area still available for goshawks. Because goshawks are forest and forest-edge predators that scan for prey from trees, creating openings larger than 4 acres effectively removes these areas from goshawk foraging habitat. The larger the opening, the less habitat is available.

Response***:*** The FEIS gives the number of acres treated, by prescription, within capable goshawk habitat (p. 4-71 – 4-73). The analysis assumes that all acres treated by regeneration prescription become unsuitable as goshawk foraging habitat, although treated areas close to forest edge and proximate to forested reserves in group shelterwood units may provide foraging opportunities for goshawks. Units that are selectively harvested remain as foraging areas (as well as potential future nest stands). As stated earlier, goshawks utilize a variety of forest structural conditions (including openings) for foraging, hence foraging habitat is not considered limiting on the landscape. Instead, the analysis focuses on the acres of suitable nesting habitat, which is believed to limit goshawk occupation of home ranges.

12-S. Comment:
…the EIS makes no mention of the number of reserve trees to be left in these openings although the management recommendations are quite specific on this matter (Reynolds et al. 1992) .The maximum recommended size of openings for goshawks is 4 acres and 200 feet across with mature reserve trees for perching. The size of the irregular shelterwood units in the preferred alternative ranges from 224 acres to 6 acres, with an average size of 67 acres. The EIS needs to calculate the actual area of each unit that is still usable for each alternative (within 200' of the regeneration unit boundary) in terms of Vegetation Structural Stage (VSS).

Response***:*** Reynolds *et al.* (1992) recommend a minimum of 6 reserve trees/acre in mixed-species forest types, and 3-5 reserve trees/acre in ponderosa pine forest types. The regeneration prescriptions proposed for units in the Mission-Brush Project (irregular shelterwood and seedtree harvest) would leave a **minimum** of 12-15 mature trees/acre in seedtree units (20-30 in shelterwood units); considerably more in selectively harvested units. The FEIS assumes that all regenerated acres would be unsuitable post-harvest. These figures are given on p. 4-73.

12-T. Comment:
The EIS also fails to describe the preferred prey of goshawks in this area and how these large openings will affect these populations. Of the 14 prey species reviewed in Management Recommendations, half are obligates of mature forests and only three are attributed to openings. Red squirrels, in particular, rely on contiguous stands of mature forests. These large openings may adversely affect red squirrel populations and their food source: Creating large openings in forests results in the reduction of the abundance of fruiting fungi, and lower populations of prey that feed on fungi (States, 1985, Pederson et al. 1987).

Response: It is true that several important goshawk prey species - including red squirrels - are obligates of mature forests; but several studies conducted in the northwest (Reynolds and Meslow 1984, Bull and Hohmann 1992) have shown most of the goshawk diet (by biomass) is composed of rabbits, ground squirrels and snowshoe hares, which readily use recently regenerated conifer stands and forest edges. While creating openings in mature forest would likely reduce red squirrel densities, it is equally likely that populations of edge-dependent prey species would increase.

12-U. Comment:
While the Forest Service is planning a 30-acre exclusionary zone around the occupied nest site, this protection should be extended to the alternate nest as well. The EIS assumes that the abandoned goshawk nest is no longer usable, and has included this nest in a shelterwood harvest in unit #20. The Forest Service should leave a 30-acre buffer around all active and previously existing but unoccupied nest sites. Due to parasites or previous disturbances, goshawks often alternate between existing nests. The proposed action could remove or make these otherwise viable nests unusable. This preferred alternative is completely inconsistent with Management Recommendations which state that no adverse management activities should occur at any time in suitable nest areas, including regeneration.

Nest areas are often used more than one year, and some are used intermittently for decades (Reynolds 1993, Crocker-Bedford 1990). Many pairs of goshawks have two to four alternate nest areas within their home range. All previously occupied nest areas may be critical for maintaining nesting populations because they contain the habitat elements that attracted the goshawk originally. Additionally, replacement nest areas are required because goshawk nest stands are subject to loss from catastrophic events and natural decline.

Response: You are correct. Reynolds et al. (1991, p. 24) recommend: "When possible, 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 is 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 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 24, 2004.) As a result, Unit 20 has been 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 portion of Unit 20 will likely 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. We maintain that this portion of the unit is not suitable goshawk nesting habitat, and is becoming even more congested with time.

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. (1991, p. 24), we recognize the opportunity for 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.

12-V. Comment:
The Forest Service needs to survey for additional existing and alternate nest sites, estimate the goshawk home ranges, calculate Vegetation Structural Stages (VSS) for each home range and predict how the project will change the VSS distribution.

Response: Suitable nest areas that would be affected by project activities were surveyed during the 2003 nesting period. Additionally, intensive District-wide goshawk surveys were conducted in 1989, 1995, 1996, and 2002. Surveys have been found to be somewhat unreliable in locating previously undocumented nest sites. On the Bonners Ferry Ranger District, the majority of documented territories have been discovered by seasonal work crews, particularly timber marking and layout crews. As stated in the FEIS, additional searches will be conducted during project layout and implementation (p. 2-57). Any newly discovered nests or territories will receive the same protections as established nests/territories.

It is impractical to conduct the sort of monitoring which would lead to reliable estimates of goshawk home range size and location on the District. This would be a highly invasive procedure requiring capture, radio-collaring and subsequent monitoring of a statistically significant sample of goshawks. Instead, we use an accepted home range size estimate of 5,000-6,000 acres reported in Warren (1990) and Reynolds et al. (1992).

Existing condition and projected changes of Vegetation Structural Stages (VSS) were overlooked in the FEIS and have been included in the FEIS. An analysis of VSSs within capable goshawk habitat in the project area gives the results displayed in the following tables.

Table RC-2 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	Imm/Pole	11.52	11.09	11.24	11.19
4	Imm/Medium	28.48	25.44	26.04	26.40
5	Mat/Large	29.20	24.87	25.73	27.83
6	Old Growth	9.20	9.20	9.20	9.20

*Percentages reflect post-treatment condition for each alternative.

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 RC-3 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	Imm/Pole	2.07	1.88	1.88	2.07
4	Imm/Medium	11.64	9.17	9.17	10.38
5	Mat/Large	39.09	32.68	32.68	38.26
6	Old Growth	13.76	13.76	13.76	13.76

*Percentages reflect post-treatment condition for each alternative.

Table RC-4 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	OldGrowth	4.75	4.75	4.75	4.75

*Percentages reflect post-treatment condition for each alternative.

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-1970's. 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 1940's – 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 (FEIS 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.

12-W. Comment:
The Forest Service needs to pay particular attention to the fact that harvest units adjacent to previous units could create combined openings that are too large to be used by goshawks.

Response*:* Of the proposed regeneration units in goshawk habitat, only the seedtree prescription in offsite ponderosa pine plantations will result in true "openings" that goshawks are unlikely to use. Other regeneration units will be treated using the irregular shelterwood (with reserves) method, which will result in a patchy mosaic of small openings interspersed with groups of residual, large trees. A minimum of 20-30 mature trees /acre will be retained in a clumpy pattern in all shelterwood units. While group shelterwood units will not retain nesting habitat, the resulting pattern of conifer stands interspersed with openings should result in a landscape that goshawks can use as foraging areas, and will not result in barriers that preclude goshawk movement.

12-X. Comment:
In addition to identifying three 30-acre stands of nest areas for each goshawk home range, the Forest Service should have identified replacement nest areas. The Management Recommendations specifically states that land managers should identify and prepare three 30-acre stands of replacement nest sites for a total of 90 acres in the event that the original nest sites are lost in a wildfire or other event. The Forest Service should manage these replacement sites to ensure future stand conditions consisting of dense, mature stands with high tree cover and high basal area. The project has not identified any such areas within the project boundary.

Response: Replacement nest areas are not an issue in the Hall/Mission area, since all alternatives would leave a minimum of eight currently suitable nest areas within an approximately home-range-sized (5,000 acre) area. Because of its younger forest structure, the Brush Lake area only contains three suitable nest stands within a similarly sized area. While no replacement nest stands have been designated, commercial thinning of approximately 225 acres of mature stands will produce structure that, over time, will result in suitable nesting stands.

12-Y. Comment:
No activity should occur in this area from February-November. The EIS does not contain this information. {The Lands Council}

Response: Reynolds et al. (1992, p. 24) recommend a management season of October – February (e.g. – no activity from March 1 – September 30) in the vicinity of an active nest. However, these dates were generated from

research conducted in the southwest, and reflect an earlier nesting period due to weather conditions. Bull and Hohmann (1992) report only one instance of territorial behavior around an active nest before March 15 in northeastern Oregon (which also has a milder climate than the Bonners Ferry District), and Maj (1996) identifies the second half of March as the courtship period in the Northern Region. Similarly, while all young may not have dispersed by early September, it is unlikely that activity outside the nest stand would result in elevated levels of mortality. Based on this, the dates of activity restrictions given in the FEIS "Features designed to protect wildlife habitat" (p. 2-57) will be changed to March 15 – September 1. This restriction can be removed after June 30 (end of incubation period) if a nest territory is determined to be inactive or unsuccessful (Maj 1996).

Cumulative Effects

12-Z. Comment:
Cumulative Effects:
The cumulative effects analysis for all issues is sorely lacking depth and implications. Past management activities seem to be acknowledged on a very limited basis, but the impacts these activities have had on the landscape were barely considered. Even the maps seem to ignore past management activities. The Idaho Panhandle must conduct an adequate cumulative effects analysis that looks at past, present and future activities. This analysis must include a detailed discussion of the specific impacts these past, present and future activities have had or will have on the landscape. From touring the immediate area and reading through the DEIS it is very clear that past activities have had a major role in changing the Mission Brush landscape. The cumulative impacts of this extremely altered landscape, combined with any recent fires and the proposed logging must be adequately analyzed. {American Wildlands}

Response: In the analysis of project effects upon wildlife species, past activities are incorporated into the environmental baseline and reflected in the "existing condition" (Chapter 3) for each species. Ongoing and reasonably foreseeable future actions (Chapters 2 and 4) are addressed in the "Cumulative Effects" discussion for each species analyzed in Chapter 4. Effects analysis of certain proposed activities have been addressed in the FEIS.

12-AA. Comment:
On page 2-18 of the DEIS the wildlife habitat discussions for Grizzly Bear, flammulated Owl, and Fisher indicated that there will be "short term" negative impacts to these species. The water and fisheries analysis in Chapters 3 and 4 of the DEIS, including pages 4-33 and 4-34, show there will be short term effects that would occur in the Mission Creek watershed. The Courts have ruled that disregarding short-term effects and instead only evaluating effects over a time frame from 10 to 20 years is arbitrary and capricious. See Pacific Coast Federation of Fisherman's Associations, Inc v. National Marine Fisheries Service, D.C. No. CV-99-00067-BJR, U.S. Court of Appeals for the Ninth Circuit, May 31,2001. The short term impacts that would result as a result of each Action Alternative is not in conformance with the ruling by the Courts concerning short and long term impacts to wildlife and fisheries habitat. {Kootenai Environmental Alliance}

Response*:* The FEIS does not disregard short-term effects on wildlife species but, as your comment points out, readily acknowledges that there may be short-term negative impacts to some species. There are numerous references to short-term impacts to individual species in the effects discussions in Chapter 4 – particularly in the grizzly bear section, where increased road densities during project implementation are addressed. At no time does the wildlife environmental consequences section attempt to discount short-term effects of proposed activities. There is some ambiguity regarding the time frame that separates "short-term" from "long-term", as this may vary among different wildlife species and diverse activities (e.g. – road decommissioning vs. stand regeneration). The FEIS attempts to clear up this confusion by defining approximate time frames for "short-term" and "long-term" for various species or actions, and by expanding the effects analyses from the FEIS in this context.

13 - Aquatics

Bull Trout

13-A. Comment:
Despite widespread habitat damage inflicted by road building, logging, and 'mining in the project area, the DEIS fails to adequately disclose and evaluate the impacts of the alternatives on bull trout and their habitat in project area, especially when Bull trout were considered to be at moderate risk of extinction on the Idaho Panhandle National Forest (Cross 1992) .Bull trout within many of the sub basins of north Idaho may be unique stock as well (FEIS .pg. 3-41). The US Fish and Wildlife Service has begun a Recovery Plan for the bull trout and will be designating critical habitat in the near future. DEIS fails to consider the likelihood that Mission and Brush Creeks will be designated as critical habitat according to the USFWS and therefore fails to demonstrate compliance with Section 7 of the ESA; the FEIS fails to demonstrate consistency with the NFMA; and the DEIS fails to actually disclose the impacts of each alternative on bull trout as mandated by the NEPA.

Response: Page 3-49 of the FEIS discusses fish presence within the project area. Pages 4-39 to 4-51 of the FEIS includes the analysis of direct and indirect effects of all alternatives analyzed. Within the US Fish and Wildlife Service Bull Trout Draft Recovery Plan, Chapter 4 contains the Kootenai River Recovery Unit. Within the Kootenai River Basin in Idaho, only the mainstem Kootenai River is proposed as critical habitat; however, it is proposed as a migratory corridor (Bull trout Draft Recovery Plan, Chapter 4, p. 40). Migratory corridors are not considered to host their own local populations.

13-B. Comment:
Why are the watersheds "functioning at risk" when Best Management Practices and other FS management was supposed to keep the streams functioning naturally?

Response: The FEIS from pages 3-43 through 3-50 describes both the reference and existing condition to explain the current condition of the watershed and how it has deviated from the past. Most of the legacy impacts within the watershed occurred before BMPs or design features were required under law.

Idaho WQS/Best Management Practice's (BMPs):

13-C. Comment:
FEIS Appendix C, pages C-1 and C-3, includes a description of Idaho Water Quality Standards that are found in IDAPA 16.01.2300.05. The IDAPA cited on both pages does not exist, as there is no IDAPA 16.01. IDAPA 16.02.01 concerns the Idaho Department of Health and Welfare, and 16.02.01 begins with the Health professional load repayment program. The correct IDAPA regulation is IDAPA 58, Title 01, and Chapter, 02. IDAP A at 58.0 1.02.050.02a and 02b include the following requirements. "Wherever attainable, surface waters of the state shall be protected for beneficial uses which for surface waters includes all recreational use in and on the water surface and the preservation and propagation of desirable species of aquatic life; In all cases, existing uses of the waters of the state will be protected."

Response: Thank you for the comment. This was probably a typo and we will review the potential error and make the needed corrections within the FEIS.

13-D. Comment:
There is no supporting data in Chapters 3 or 4 of the DEIS that conclusively shows Idaho water quality regulations found in Idaho Code and IDAPA will be met with the Action Alternatives.

Response: Idaho Code and IDAPA are Idaho State Statues of the Clean Water Act. The FEIS (page 4-50) references that all alternatives are consistent with the requirements of the CWA. We will make it clearer in the FEIS that this also pertains to Idaho Code and IDAPA.

13-E. Comment:
The FEIS needs to cite the specific sections of Idaho Code and IDAPA 58.01.02 that allow increases of sediment into one or more receiving waterbodies and downstream water bodies that have existing beneficial uses.

Response: The FEIS will make the citations if the project meets the regulatory framework of the State Water Quality Statutes as well as the Clean Water Act.

13-F. Comment:
There is no quantitative monitoring data cited in the DEIS that confirm BMPs that were associated with the previous timber sales in the project area in fact prevented degradation to fisheries habitat and stream channels.

Response: The FEIS on page 2-47 references Idaho Panhandle National Forests Forest Monitoring Plans, which provide quantitative monitoring data on implemented BMPs.

13-G. Comment:
On page 3-51 of the DEIS the 1996 State of Idaho Bull Trout Plan is briefly mentioned and a statement is made on page 3-51 that a Problem Assessment is being produced. It is indicated a Problems Assessment is being prepared (KRTTAT, draft) but the literature citation on page 3 does not include any information regarding the persons and/or organizations that comprise KRTTAT.

The DEIS needs to supply information that will indicate whether any Forest Service personnel are members of the group that is working on the Problem Assessment. The DEIS also needs to supply a clearer description of the lead Agency that is working on the KRTTAT. The literature citation section also needs to fully describe the KRTTAT.

Response: The information from KRTTAT has been incorporated into the U.S. Fish and Wildlife Service Bull Trout Recovery Plan for the Kootenai River Basin. The FEIS will correct this information. The scope of this EIS is the documentation of potential environmental impacts related to the Mission Brush Project.

13-H. Comment:
On page F6 of the Bull Trout Conservation Plan document the Key Watersheds for the Panhandle Basin are listed. Included on this list is the Kootenai River with the following language "The entire Kootenai River drainage within Idaho." The DEIS did not provide a map of the Kootenai River Key Watershed. The Conservation Plan document on page M 1 displays the map of the Kootenai River Key Watershed.

The Final EIS needs to indicate whether any portion of the National Forest lands in the Mission Brush project area are included within the boundaries of the Key Watershed. If no National Forest lands are within the boundaries of the Key Watershed, but are adjacent to the boundaries of the Key Watershed, the FEIS needs to supply high quality information that will indicate the number of acres of National Forest lands that are adjacent to the Key Watershed.

Response: The detailed map on page M1 of *State of Idaho. 1996. Governor Philip E. Batt's State of Idaho Bull Trout Conservation Plan. Boise, Idaho. July 1, 1996* shows the Kootenai River Key Watershed as being the mainstem Kootenai River (KR) from the Canadian border to (and including) Deep Creek and the tributaries from the west of the KR. The Mission Brush Project area is outside the Key Watershed boundary as identified in the 1996 document.

13-I. Comment:
It is also stated on page 3-51 of the FEIS that details of the Plan could be found in Appendix B. The only mention of Bull Trout in Appendix Bis on page B-15, which consists of two sentences. There is no discussion of the State of Idaho Conservation Plan in Appendix B.

Response: The FEIS will correct this information. The project file contains the information related to the Mission Brush Project out of the following document: State of Idaho. 1996. Governor Philip E. Batt's State of Idaho bull trout conservation plan. Boise, Idaho. July 1, 1996.

13-J. Comment:
The fisheries analysis on page 3-47 of the DEIS mentions channelization of the lowest portions of Mission and Brush Creeks. It is stated on page 3-47 "As a result, habitat degradation in this reach is extensive, likely resulting in a thermal barrier to bull trout migration from the Kootenai River." This sentence is not clear as to whether there

is significant habitat degradation in both of the lowest portions of Mission Creek and Brush Creek, or in only one Creek. The FEIS needs to state whether both Creeks have significant habitat degradation that has resulted in a thermal barrier.

The FEIS also needs to supply expert agency comments regarding the temperature studies that have been performed that indicate there are temperature problems in one or both Creeks that prevent bull trout migration from the Kootenai River. There should be information that will describe the number of temperature devices that are located in one or both Creeks and the year(s) when the temperatures were recorded in one or both Creeks.

On page 3-39 of the DEIS the following statement is found. "Although bull trout may have been historically present across the project area, they currently occur within the main stem Kootenai River." The FEIS needs to clarify whether the channelization of the lowest portions of Mission and Brush Creeks occurred only on private property, or on both private and National Forest lands. If channelization has occurred only on private lands, information should be supplied regarding the years when the majority of the channelization occurred, if this information is available.

Response: The Watershed Existing Condition section, pages 3-48 to 3-51, contains detailed descriptions of both Mission and Brush Creeks. The private land where the channelization occurred is outside the project boundary, but is included in the cumulative effects area.

Water temperature is discussed on pages 3-33 and 4-50, under Clean Water Act and on page 3-48 under Beneficial Uses. On page 3-40 of the FEIS, the importance of low temperatures to bull trout is explained. By designing activities outside RHCAs, there would be no overstory removal. Therefore, there would be no effect to water temperature from these activities.

Pages 4-48 to 4-49 discuss cumulative effects to fisheries. On private lands, past riparian harvest and channelization by flume construction removed a substantial portion of the overstory and large woody debris available for recruitment. Removal of the overstory permits increased solar radiation directly to the stream.

WATSED Model:

13-K. Comment:
The WATSED discussions in Chapter 3 did not include Forest Service information that described significant underestimation of sediment production, up to 300% and more, when the model was used by Forest Service professionals. The Final EIS for the Rock Creek Project, Kootenai National Forest, 2001, included Appendix N. Appendix N concerned sediment mitigation calculations. The analysis on pages N-9 and N-1 0 indicated that the WATSED model underestimated sediment production by 300% or more.

Another sediment issue relating to the model is the accuracy of sediment routing when the model is used. On page 3-35 of the Mission Brush FEIS, the WATBAL Technical User Guide is cited in the discussion of sediment modifications in the Mission Creek watershed. " The WATBAL Technical User Guide on page 15 includes the following language regarding sediment routing. "WATBAL uses a primitive equation based on a function of the area of the watershed to perform this function. It is recognized that this lack of accurate stream routing and insufficient recognition of stream dynamics is the weakest and as a critical element must be given top priority in future developments.

There is no analysis in Chapters 3 or 4 of the DEIS that shows the projected sediment increases associated with each Action Alternatives in fact may be significantly underestimated with the model.

There is also no discussion in either Chapter concerning the significant sediment routing problems associated with the WATBAL model. In the event this problem has not been corrected with the WATSED model, the sediment predictions for the Mission Creek watershed do not display a high degree of scientific accuracy. The FEIS needs to provide information that will indicate whether there continues to be significant sediment routing problems associated with the WATSED model.

Response: The results, data and calibration used with the WATSED model are specific to the Idaho Panhandle National Forests. Results from different forests do not reflect the outcomes generated by the model used on this

forest. The soils, climate, hydrology, and landtype files are completely different. The methodology section on pages 3-36 and 4-34 explains in detail the applications, limitations, and assumptions on how the model was used for the Mission Brush analysis. Also this section explains that WATSED is the model used for the project, not WATBAL.

WATSED is an analysis tool that models watershed **Response** relationships as a result of forest practices. The estimated **Response**s are combined with other sources of information and analyses to determine the finding of probable effects.

The Mission Brush FEIS supplies the results by alternative for changes in sediment yield and peak flows. WATSED is not the only tool for estimating alternative effects in this project. Restoration activities, mitigation measures and design features are also used to track changes.

13-L. Comment:
An additional sediment yield issue associated with the model is the timeline used to calculate increases in sediment yields. The figure 4-13 on page 4-34 of the DEIS only consists of the years 2002 to 2010. There is no data or figures in Chapter 3 or 4 that confirm sediment yields would return to natural levels after logging activities associated with Alternative's 2,3, or 4 were completed.

Response: The limitations of the WATSED model are again explained on pages 3-35, 36. Figure 4-13 does in fact show that recovery will occur in 2010 from logging activities back to baseline conditions. Figure 3-35 within the Affected Environment Section shows recovery to natural levels will never occur due to the existing roads.

13-M. Comment:
The FEIS needs to supply high quality information with expert agency comments that describe the WATSED coefficients that were used to calculate the project percent increase in peak flows and water yields out to the year 2040.

Response: The results, data and calibration used with the WATSED model are specific to the Idaho Panhandle National Forests. The methodology section on pages 3-35 and 4-34 explains in detail the applications, limitations, and assumptions on how the model was used for the Mission Brush analysis. Also, page 4-40 and 4-41 explains that the overall increase in water yield would likely be undetectable.

Cumulative effects/watershed impacts:

13-N. Comment:
The cumulative effects analysis in Chapter 4 did not provide data and analysis of the expected cumulative effects to the watersheds in the project area from the past and projected logging activity on private lands taken together with logging activities associated with each Action Alternative.

Response: The FEIS on page 4-34 explains that some of the reasonably foreseeable actions are modeled in WATSED. Also page 4-46 explain the cumulative effects of reasonably foreseeable activities and how they were assessed.

13-O. Comment:
The FEIS needs to supply accurate scientific analysis, high quality information, and expert agency comments from the Forest Service soil scientist and hydrologist that describe the estimated impacts to water bodies in and below the project area from one or more high intensity storm events that would cause loss or erosion of soils.

Response: The Aquatic Resources Environmental Consequences section within the FEIS provides this analysis thoroughly for both the project area and the cumulative effects area.

13-P. Comment:
The FEIS cumulative effects analysis should also include data listing the total number of acres of forest lands with slopes greater than 40% that would be within the project area if Alternative 2, 3, or 4 was implemented.

Response: The WATSED model generates a slope coefficient to estimate erosion and sediment delivery of forest activities on steep slopes. This is covered in the Aquatic Resources Environmental Consequences section within the FEIS.

13-Q. Comment:
The discussion on page 3-33 of the DEIS concerning the CWA stated that no stream within the project area is currently listed on the Idaho 303(d) list. The Idaho Department of Environmental Quality (DEQ) June 2, 2003 document "Draft Integrated (303(d)/305(b)) Report in Section 2 contains a listing of waterbodies that support some uses. Section 2 lists the Mission Creek waterbody from the Idaho/Canadian border to Brush Creek, 9.06 miles, is listed in this category. In Section 3 of the DEQ Report it is indicated that 3.76 miles of Mission Creek-Brush Creek to mouth had not been assessed.

Response: True, however, since the June 2003 is draft and has yet been approved by EPA, we have to reference the 1998 list, since it is the one governed by law. Our proposed activities still recognize and prevent effects on Mission and Brush Creek whether streams are listed or not.

13-R. Comment:
The FEIS needs to provide accurate information that will indicate whether the 3.76 miles have been assessed for sediment and/or temperature problems.

Response: The FEIS on pages 3-43 through 3-52 explains in detail the existing condition of the stream channel characteristics as well as fisheries habitat. Existing stream temperature

13-S. Comment:
There is insufficient scientific analysis and data in the Mission Brush DEIS to substantiate the statements made that each Action Alternative is in compliance with Federal and State water quality laws that apply to the water bodies located within and below the project area.

Response: The FEIS, page 4-50, summaries the reasons all action alternatives meet the requirements of the Clean Water Act and other state statues.

13-T. Comment:
In the Final Environmental Impact Statement for this project, the Department recommends addressing the role of ground water in the hydrology of the study area, the impacts of implementing the various alternatives on ground water, infiltration, and the contribution of ground water to streamflow.

Response: Alternative analysis on ground water, infiltration and the contribution of ground water to stream flow are difficult parameters to monitor within the project area. They are indirectly assessed by eliminating or limiting activities on landtypes or soil types are perennially saturated (FEIS, Page C-5). The water yield analysis (FEIS 4-40) concludes that increases would likely be undetectable within Mission Creek, and I would believe the same would be true for groundwater.