United States Department of Agriculture
Forest Service
Northern Region

Chips Ahoy

Draft Environmental Impact Statement

February 2004

Priest Lake Ranger District
Idaho Panhandle National Forests

Idaho Panhandle National Forests
Priest Lake Ranger District
Bonner County, Idaho
Pend Oreille County, Washington

Chips Ahoy
Draft Environmental Impact Statement
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Abstract

The Chips Ahoy project proposes vegetation, wildlife habitat, recreation, and aquatic improvement treatments on National Forest lands in the Upper West Branch watershed of the Priest River on the Priest Lake 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 A (No Action) would defer all activities that are not part of current management. Alternative B (modified Proposed Action) includes vegetation treatments on approximately 1,680 acres, and 2.5 miles of temporary road construction. Alternative C treats approximately 1,600 acres, and includes 0.3 miles of temporary road construction. Alternative D treats approximately 840 acres, and requires no construction of temporary roads. Access would be provided through the existing road system; about 0.7 miles of permanent road construction is proposed to reroute a portion of road that is currently located in a riparian area. Road improvements, storage, and decommissioning are designed to reduce the entry of sediment into the aquatic system. **Alternative B is the preferred alternative.**

Copies of this DEIS and Summary are available in printed format or on compact disc (CD) from the Priest Lake Ranger District; the documents are also available on the Idaho Panhandle National Forests' internet site at the following URL: http://www.fs.fed.us/ipnf/eco/manage/nepa/index.html.

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CHAPTER I - Purpose and Need for Action

1.1 Introduction

This DEIS was prepared following the Regulations for Implementing the National Environmental Policy Act (40 CFR 1500-1508), which directs the procedures for documenting analysis of proposed management activities on federal lands. "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" (40 CFR 1500.1(c). "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).

1.2 The Chips Ahoy Project Area

The Chips Ahoy project area encompasses most of the Upper West Branch of the Priest River watershed. It covers approximately 38,000 acres of the 45,000 acres in the entire Upper West Branch watershed. The project boundary includes the entire watershed below Paqua Creek. About 36,000 acres are National Forest lands in the Priest Lake Ranger District; about 2,000 acres are private land (figure 1-1). About 20 homes and ranches are found within the project area.

The project area is on the Priest Lake Ranger District of the Idaho Panhandle National Forests, within northern Idaho and northeastern Washington. In Bonner County, Idaho, it is located within all or portions of Sections 5, 6, 7, 8, 9, 10, 11, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34, T.59N., R.5W., Boise Meridian. Within Pend Oreille County, Washington, it is located within all or portions of Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27 and 28, T.34N., R.45E., and sections 6, 7, 18, 19, and 30, T.34N., R.46E., Willamette Meridian.

Ecosystems in and around the Chips Ahoy project area are diverse, ranging from valley bottom meadows to sub-alpine forested peaks. The project area provides habitat for a wide variety of game and non-game species including federally listed threatened and endangered species. The area is also important to the local economy because it contains groomed snowmobile routes, hiking trails, hunting and fishing opportunities, wood products, and huckleberries. Most of the project area is accessible by vehicle.

The Chips Ahoy DEIS describes the current and desired future conditions of the ecosystems in this area. Key issues, identified as "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 official, as well as meetings with and written comments received from the public and other governmental agencies. Ways to measure and describe potential changes, shown as "Issue Indicators," are listed in Chapter II.

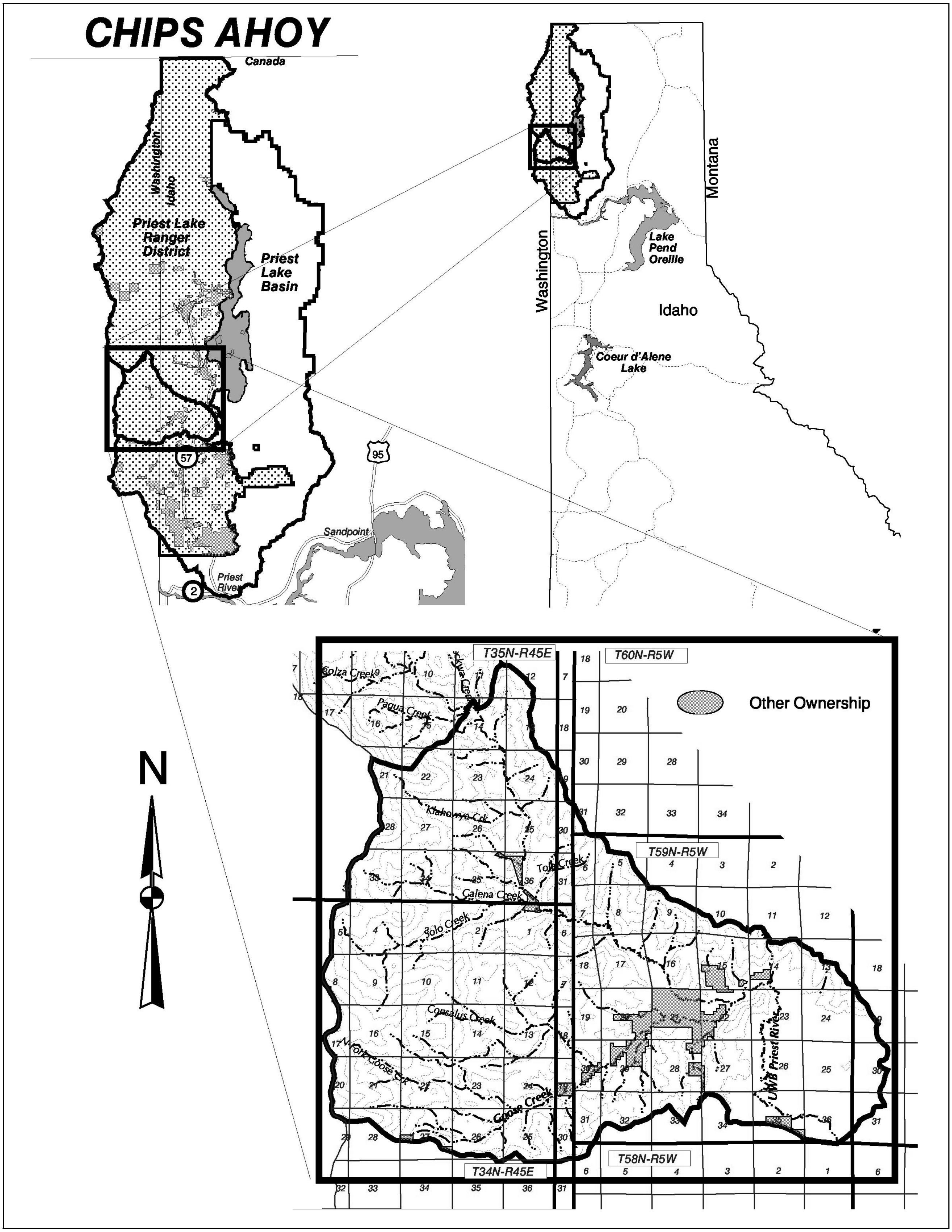

Figure 1-1. Chips Ahoy project area map.

1.2 Purpose and Need for the Chips Ahoy Project

The purpose and need for proposed management activities in the Chips Ahoy project area include four primary considerations – vegetation, aquatics, wildlife habitat, and recreation. The purpose and need reflect Forest Plan direction and goals as well as the current and desired future conditions for the Chips Ahoy project area described below.

1.21 Vegetation

IPNF Forest Plan goals for vegetation (Forest Plan, p. II-8) state:

- Management activities will promote programs that provide a sustained yield of forest products consistent with the multiple-use goals.
- Timber management activities will be the primary process used to minimize the hazards of insects and diseases and will be accomplished primarily by maintaining stand vigor and diversity of plant and animal communities and tree species.

The existing condition of the project area is not meeting these goals, as described in Chapters II and III of this DEIS. There is a need to trend the vegetation composition, structure, and diversity of forest stands in the project area toward tree species and stocking levels similar to historic levels that are better able to resist insects, diseases and stand-replacing wildfires. The Chips Ahoy proposed action would meet this need for change through silvicultural treatments to meet the following objectives:

- Increase the amount of dry forest communities that are dominated by ponderosa pine and are closer to historic stocking levels.
- Increase the amount of moist forest communities that are dominated by western white pine and western larch. Begin to re-establish western white pine as a significant component of its historic range.
- Restore the role of fire by creating stand conditions that allow a repeated pattern of low-intensity ground fires to create results similar to historic fire patterns.
- Trend stands toward species composition that favors species less susceptible to root disease.
- Increase structural diversity and the percentage of large, older trees.
- Contribute to the supply of commercial wood products to help meet the national demand for wood products and local employment opportunities. The amount of timber harvested would be a by-product of meeting the ecosystem restoration objectives described above.

1.22 Aquatics

IPNF Forest Plan goals for aquatic resources (Forest Plan, p. II-9) state:

- Maintain high quality water to protect fisheries habitat, water based recreation, public water supplies, and be within state water quality standards.

There is a need to improve the aquatic ecosystems (watershed and fisheries) in the Upper West Branch of the Priest River drainage, as described in Chapters II and III. Specifically, that need includes reducing erosion and sediment delivery from road surfaces and ditches that are currently contributing sediment to the Upper West Branch and its tributaries.

The need for change would be met by permanently closing or putting into storage roads that have been identified as no longer needed for the transportation system in the project area.

1.23 Wildlife

IPNF Forest Plan goals for wildlife (Forest Plan, pp. II-5, II-6) state:

- Manage vertebrate wildlife habitat to maintain viable populations of species other than Threatened, Endangered and Sensitive species
- Manage the habitat of T&E species under the Endangered Species Act to contribute to the conservation and recovery as outlined in the species recovery plans
- Manage habitat of identified sensitive species to prevent the need for federal listing under the Endangered Species Act

Forests in the project area are relatively similar in size and age and are not providing a diversity and wide range of plant and animal communities and habitats. There is a need to trend toward an ecosystem composed of vegetation that more closely resembles the historic range of variability. Specifically, there is a need to 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.

These needs for change would be met through silvicultural treatments designed to achieve the objectives described above for vegetation.

1.24 Recreation

IPNF Forest Plan goals for recreation (Forest Plan, p. II-3) state:

- Provide for a variety of dispersed recreation opportunities.

There is a need to maintain snowmobile access to the project area while protecting water quality, fisheries, and wildlife habitat. Through a prior environmental analysis (USDA 1999), it was decided to remove approximately 1.6 miles of Road 1108 in the riparian area of Consalus Creek. As road 1108 is an established snowmobile route, there is a need to provide continued access to winter recreationists.

1.25 Overview of Scientific Findings from Large- and Mid-Scale Ecosystem Assessments

The following section summarizes findings from three large to mid-scale ecosystem assessments. Their perspectives on forest vegetation conditions and trends over larger areas helped to identify the scope and focus of this analysis. Conditions in the project area were compared to findings at the larger scales; this process helped to develop the proposed management activities that could be used to move the vegetation toward the desired conditions.

1.25a Columbia River Basin

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) Scientific Assessment evaluated the public lands administered by the USDA Forest Service and USDI Bureau of Land Management within Eastern Oregon, Eastern Washington, most of Idaho, and the westernmost portion of Montana.

The Chips Ahoy project lies within lands classified as Forest Cluster 4 in the Scientific Assessment. The forests within this area were rated low for forest integrity. The primary risks to forest integrity in this area were identified as forest compositions susceptible to insects, disease and fire. Risks to late and old forest structures in managed areas were also identified as threats to forest integrity. Opportunities to address these risks were identified as treatment of forested areas to reduce fire, insect, and disease susceptibility; and restoration of late and old forest structure in managed areas (Quigley, Haynes and Graham 1996, pp. 113, 115, 116).

Throughout the Interior Columbia Basin, disturbances such as fire and insect mortality have played an important role in determining forest tree composition (Quigley and Arbelbide 1997). In northern Idaho and eastern Washington, the most significant historic natural disturbance was fire. In addition to natural disturbance, the Assessment found that land management activities and introduced pathogens have dramatically altered the species and age composition of trees in the overstory.

Historically, coniferous tree composition in the Interior Columbia Basin was dominated by ponderosa pine, western larch and western white pine. These long-lived tree species typically established after some form of disturbance and have the potential to occupy a site for 200-300 years. Many of the local disturbances initiated these long-lived species and maintained them in mature conditions. Stands of these trees were adapted to regenerate in and to survive local fire regimes. Other disturbances, such as historic levels of insect populations and wind and winter storm damage, contributed to stand mortality. As trees died, they became fuel wood and over time created conditions for large stand-replacing fires.

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

1.25b Northern Region Overview

The Northern Region Overview (USDA 1998) considered and incorporated findings from the ICBEMP and the Northern Great Plains Assessments and focused on priorities for restoring ecosystem health and availability of recreation opportunities. Some of the findings of the overview pertinent to vegetation conditions in the project area are discussed below.

Due to interaction of agents such as blister rust and mountain pine beetle, followed by salvage harvests since the 1930s, over 95 percent of the white pine type has changed to grand fir, Douglas-fir, and western red cedar/western hemlock cover types with an associated change to a largely mid-seral stage structure.

The risk regionally is high for a continued loss of western larch cover type and emergent structure due to the lack of low intensity, periodic disturbance and the shift toward stand-replacing fire.

Current structures are typified by mid- to mature age/size classes with relatively few areas in the seedling and sapling structural stage. In northern Idaho and western Montana, typical stand structure and composition is multi-layered and is comprised primarily of Douglas-fir and grand fir. The areal extent of the Douglas-fir cover type has increased greatly, with an associated increase in mid-seral species. This is a result of a combination of fire exclusion, selective harvest of large early-seral species, and especially the loss of western white pine. An increase in root disease has correspondingly reduced the productivity and health of forests in northern Idaho and western Montana in this type as a higher percentage of the most susceptible host species (Douglas-fir and grand fir) exists today.

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." The Overview states, "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…"

1.25c Priest River Subbasin Geographic Assessment & Chips Ahoy Project Area

Because of the local variation in landscapes throughout the Columbia Basin, the Idaho Panhandle National Forests (IPNF) are in the process of completing a Geographic Assessment for the northern subbasin ecosystems -- Priest River, Pend Oreille, and Kootenai. The data for the assessment compare historic and current ecological, social, and economic conditions of the subbasin ecosystems.

The assessment identifies ecosystem trends and changes in vegetation over the last 100 to 200 years. Findings of the North Zone Geographic Assessment (NZGA) are similar to those of the Northern Region and Interior Columbia Basin Assessments, but provide more specific information on lands in the subbasin ecosystems. Although the NZGA is still in draft form, data that have been compiled for the assessment are used throughout this document to describe the existing conditions and desired trends. Tables, graphs, and characterizations that have been assembled during the subbasin analysis are referenced as "USDA draft in progress" in this document. The Priest River subbasin geographic assessment is the portion of the NZGA that encompasses the Chips Ahoy project area.

In the Geographic Assessment, the majority of forests in the Chips Ahoy project area were identified as being within a low integrity/high risk landscape. These areas are the most heavily altered from historic conditions and contain the greatest need and opportunity for large-scale vegetation restoration.

According to the Geographic Assessment, the Upper West Branch of Priest River Watershed is considered "not properly functioning" (NPF) due to its high inherent sensitivity and the high riparian and watershed disturbance that has occurred in the past. Past road and railroad construction and logging activities were focused in the headwaters and stream bottoms of this watershed.

1.26 Desired Future Conditions

1.26a Vegetation

The desired condition for forests in the project area includes multi-species stands that are well adapted to the specific site characteristics, with long-lived, seral species (ponderosa pine, western larch, and western white pine) well represented. Forest stands would be resistant to natural disturbances such as insects, disease and wildfire and would provide a wide range of benefits including watershed protection, wildlife habitat, recreation, and a sustained yield of forest products.

1.26b Aquatics

The desired condition for the Upper West Branch and its tributaries is a trend toward watershed recovery to a properly functioning condition (PFC). Watersheds that are considered PFC are operating and responding appropriately in their current environment. Such systems can absorb and respond to disturbances under which they have evolved within their historic range.

1.26c Wildlife

The desired condition for the project area is the wildlife habitat maintains habitat for viable populations and contributes to the conservation and recovery of threatened and endangered species as outlined in the species recovery plans and the habitat of identified sensitive species prevents the need for federal listing under the Endangered Species Act.

Forests in the project area are providing a diversity and wide range of plant and animal communities and habitats. The ecosystem is composed of vegetation that closely resembles the historic range of variability. There is a diversity of forest structures in the area, including larger patch sizes with less fragmentation. This would provide for wildlife, fish, and plant habitat diversity.

1.26d Recreation

The desired condition for the project area is to provide for a variety of dispersed recreation opportunities and to maintain snowmobile access to the project area while protecting water quality, fisheries, and wildlife habitat.

1.3 Proposed Action

The proposed action for the Chips Ahoy Project is designed to improve the health and productivity of terrestrial and aquatic habitats by restoring forest vegetation and reducing sediment risks. The proposed action is also designed to trend the project area toward improved forest health and increased biodiversity. The resulting changes in forested conditions would provide more diverse habitat for wildlife species in the area. Proposed road maintenance and decommissioning activities would help reduce the amount of sediment entering the Upper West Branch watershed.

Proposed activities for the Chips Ahoy Project would include:

- Selective cutting in overcrowded stands of trees to promote the growth and productivity of species such as larch and ponderosa pine
- Regeneration cutting in stands where there is high mortality, risk of high mortality, or undesirable species and replanting the stands with desired longer-lived species
- Burning to reduce fuels, improve growing conditions, and restore fire as an ecological process
- Improving the design, drainage and stream crossings of existing roads to reduce sediment risks to aquatic habitat
- Building temporary roads, decommissioning unneeded existing road segments; and putting some road segments into storage for future use

The specific activities in Alternative B – the Proposed Action – are described in detail in Chapter II. In general, our proposal for management includes vegetation treatments on 1,640 acres, 2.5 miles of temporary road construction, 58 miles of road decommissioning or storage, 32 acres of prescribed burning for wildlife habitat and ecosystem, and rerouting winter recreation away from portions of Road 1108 to Road 333B.

1.4 Scope of the Analysis

The Chips Ahoy DEIS analyzes the environmental effects of the proposed action in the project 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. Development of alternative strategies for the project is 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 (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 (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 III.

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.

1.41 Past Activities and Events

Past activities and events that have contributed to the current baseline conditions in the project area today, and that may be included in the cumulative effects analysis, include introduction of white pine blister rust, outbreaks of bark beetles and defoliators, root rots, historic timber harvesting, road building, and fire suppression.

1.42 Current Management and Ongoing Activities

Even if no activities were being proposed under the Chips Ahoy project, certain management activities 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.
- 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, hunting, fishing, camping, driving, berry picking, snowmobiling, and cross country skiing.
- Activities on private lands within the project area, such as continued use of agricultural lands, forest land management, and residential use.
- 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, Idaho Department of Lands, and Washington Department of Natural Resources
- Road treatments and other activities that were previously analyzed in the Douglas-fir Beetle Project FEIS and Record of Decision (1999).
- Other restoration projects - noxious weeds monitoring and treatment, native seeding and timber stand improvement (tree thinning and pruning in plantations).

In addition, several special use permits exist in the area for utility sites and corridors and access to private lands, these special uses are expected to continue.

1.43 Reasonably Foreseeable Activities

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

- Two Grazing allotments in the project area have not been utilized by the permittee since 2001; they are expected to return to use after 2005.
- Fuels treatments are planned within the Upper West Branch drainage associated with the Flat Moores Timber Sale, including excavator piling in fiscal year 2004, pile

burning on about 23 acres in fiscal year 2004 or 2005, and underburning on about 70 acres in fiscal years 2004-2005.

- Improvements at the Priest Lake Information Center at Dickensheet Junction may include an additional RV pedestal for a second Host.
- Improvements on the Chipmunk Rapids Loops Trail System, including installation of trailhead and directional signs and viewing benches and reduction of roadbed width to 36" to prohibit motorized use by passenger vehicles & ATVs to return area to a more natural setting.

1.5 Policy Direction and Legal Framework

1.51 Laws

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

1.51a 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)
- The Forest and Rangeland Renewable Resource Act (1974)
- The Archaeological Resources Protection Act (1979)
- The National Historic Preservation Act (1966)
- Idaho Forest Practices Act (1974) and amendments
- Multiple Use Sustained-Yield Act of 1960
- Endangered Species Act (ESA) of 1973 (as amended)
- American Indian Religious Freedom Act of 1980

1.51b 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)

1.52 Natural Resource Agenda

On March 2, 1998, former Forest Service Chief Mike Dombeck announced the Forest Service Natural Resource Agenda. The Agenda provided 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. Sustainable forest ecosystem management would be addressed by converting stands to desired, long-lived species less susceptible to disease, by improving growth and productivity of those species where they exist, and by reducing potential fire severity and the continuing mortality of insect and disease infested stands. Forest roads would be addressed by constructing temporary roads to accomplish proposed activities, by reducing sediment risks posed by existing roads, and by decommissioning unneeded roads or putting into storage roads intended for potential future management. Recreation would be addressed by managing existing recreation opportunities in a way that protects the natural resources in the Chips Ahoy project area.

1.53 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 set forth that if a forest level roads analysis has not been completed, the Responsible Official (in this case, the Sandpoint District Ranger) determines whether a roads analysis is needed at the project scale, and if so, what level of analysis is necessary to support a project-level decision. On April 17, 2003, the Priest Lake District Ranger established direction for a roads analysis for the Chips Ahoy project (project file). See Transportation section of the project file for more information.

1.54 Forest Plan Management Area Direction

The IPNF 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 IPNF Forest Plan embodied the provisions of the National Forest Management Act (NFMA) of 1976 and its implementation regulations, as well as those of other guiding documents (see "Laws" section).

1.54a Management Areas

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

The Chips Ahoy project area is comprised of lands in five MAs and Riparian Habitat Conservation Areas (RHCAs). Management Areas are described in detail in the IPNF Forest Plan on pages III-1 through III-87. Summaries of the Management Area Goals specific to the project area are as follows:

Management Area 1 (30,000 acres): Consists of lands designed for timber production that are distributed throughout the Forests. The site-specific management goal for this MA is to provide cost-effective timber production while protecting soil productivity, adhering to State water quality standards, providing wildlife habitat, providing opportunities for dispersed recreation, and meeting visual quality standards.

Management Area 4 (5,000 acres): Consists of lands designated for timber production within big game winter range. The management goal for this MA is to provide sufficient winter range requirements, through scheduled timber harvest and permanent forage areas.

Management Area 9 (3,500 acres): Consists of lands designated as 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 landtypes or nonpublic ownership. These areas are managed to maintain and protect existing improvements and resource productive potential with minimum investments.

Management Area 14 (400 acres): Consists of research natural areas for non-manipulative research, observation, and study of undisturbed ecosystems.

Management Area 15: Consists of lands to be managed for grazing use while protecting other resource values. These areas overlie the other management areas.

Inland Native Fish Strategy (INFS) Riparian Habitat Conservation Areas (3,774 acres): The standards and guidelines under INFS provide the management direction for RHCAs. In 1995 this direction replaced previous forest plan direction for managing riparian areas using standards and guidelines described for Management Area 16.

1.6 Decision To Be Made

This environmental analysis is not a decision document. The DEIS discloses the environmental consequences of proceeding with the proposed action or any of the alternatives. After the Draft EIS goes through the 45-day comment period, a Final EIS will be produced. The Responsible Official (Forest Supervisor) will then select an alternative based on the information in this document, on public comments, 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 pre-commercial thinning and watershed restoration activities

CHAPTER II - Proposed Action & 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 one alternative that was considered but eliminated from further study.

The desired condition, purpose and need statements, and management area objectives identified in Chapter I, 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

The first public notice of proposed management activities in this area was made in 2002 for a project identified as Chips Ahoy Environmental Impact Statement (EIS). The project was included in the October 2002 Schedule of Proposed Actions, which was sent to approximately 350 contacts on the IPNF mailing list.

The Notice of Intent (NOI) to prepare an Environmental Impact Statement was published in the Federal Register in December 2002. The District received 22 comments from individuals, groups, and agencies in response to the NOI. From these comments and additional information provided during internal scoping, the proposed action was modified. A revised NOI, published in the Federal Register in June 2003, asked the public to review and provide comments on the redesigned proposal. The District received 16 comments from individuals, groups, and agencies.

2.11 Public Involvement Efforts

The Chips Ahoy project file contains the public letters, records of phone calls and visits to the area, mailing lists, news articles, the Quarterly Schedule of Proposed Actions, and other documentation of the outreach and discussions held with members of the public.

The interdisciplinary team reviewed the content of all of the comments received and categorized them into issues. These issues were used to develop the alternatives and analysis described in this EIS. The issues are discussed in detail in the section entitled Key Issues. Comments received during the earlier scoping and analysis are part of the project file.

2.12 Public Review of the Draft EIS

When provided in a timely manner, comments by the public and other agencies help the interdisciplinary team and Responsible Official take a "hard look" at potential environmental and social-economic effects, as required by NEPA. Members of the public are encouraged to visit with Forest Service officials during the comment period for this Draft EIS. The comment period for this Draft EIS is 45 days from the date of publication of the Notice of Availability (NOA) in the Federal Register.

Although comments can be submitted at any time, if they are not received prior to release of the Final EIS, they might not be timely for consideration in selection of an alternative for this project.

Comments that address specific elements of the Chips Ahoy proposal and alternatives would be most helpful in responding to issues and concerns that have not already been included in the Draft EIS. These comments will be used to adjust and refine the analysis, clarify and correct text in the EIS, and to prepare the Final EIS and Record of Decision. Thoughts and concerns at a larger scale, such as those appropriate for the Forest Plan Revision, will have less bearing on this environmental analysis and proposed project.

The Final EIS will contain a section with the comments on the Draft EIS and the interdisciplinary team's responses to the comments.

2.2 Issues

Two levels of issues are used in this analysis. **Key issues** are those within the scope of the project and of sufficient concern to drive the development of alternatives to the Proposed Action. The key issues are specific to this geographic area and proposal, and provide a good comparison between alternatives during analysis. **Analysis issues** were not key in developing alternatives but are important for their value in designing specific protective measures and to measure the effects of the alternatives on different forest resources.

The interdisciplinary team identified "issue indicators" to measure how each issue would be affected by the alternatives. Each issue may have more than one indicator, depending on its complexity. Issue indicators were selected for their ability to show the differences between alternatives.

2.21 Key Issues

This section describes the key or principal issues that were used to develop alternatives to the proposed action 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.

***Issue:* The effects of regeneration cutting and resulting canopy openings on water yield increases, and sediment delivery to streams.**

Alternative D addresses this issue by using only selective cutting and by treating fewer acres with smaller canopy openings.

<u>Issue Indicators:</u>

- Percent change in the magnitude, intensity and duration of water yield from the existing condition.
- Percent change in magnitude, intensity and duration of sediment delivery from the existing condition.
- Total estimated sediment delivered in tons over the duration of the project.
- Overall sediment reduction in tons.

***Issue:* The effects of road construction, decommissioning, and maintenance activities on sediment delivery to streams and aquatic habitat.**

Alternative C addresses this issue by featuring no new or temporary road construction.

Issue Indicators:

- Net associated risk of sediment delivery (in tons) from road drainage crossings.
- Percent change in the magnitude of sediment yields from the existing condition.

2.22 Analysis Issues

As stated above, analysis issues are those issues that did not warrant development of alternatives to the proposed action. These issues were considered in developing design criteria and mitigation measures for the action alternatives. Analysis issues are considered in comparing the effects of all of the alternatives on a variety of forest resources.

Issue: **Effects of project activities on forest vegetation**

Issue Indicators:

- Acres and percent change in vegetation structure and cover type.
- Changes in patch size.

Issue: **Effects of project activities on sensitive and rare plants**

Issue Indicator:

- Relative amount of canopy opening and or ground disturbance in and next to known plant populations or suitable habitat.

Issue: **Risk of spread of existing noxious weed populations and introduction of new invaders due to project activities**

Issue Indicator:

- Relative amount of ground disturbance and canopy removal

Issue: **Effects of project activities and road management on wildlife habitat and security as related to sensitive and management indicator species groups**

Issue Indicators:

- Flammulated owl – trend toward suitable habitat conditions.
- Canada lynx – acres of lynx habitat protected.
- Grizzly bear - Changes in open and total road densities and key habitats
- Northern goshawk - Trends in suitable nesting habitat.
- Fisher - Changes to habitat suitability.
- Pileated woodpecker - Changes to and availability of large snag habitat.

Issue: **Effects of project activities on soils**

Issue Indicator:

- Percent of detrimentally disturbed soils
- Potential for loss of potassium and woody debris

2.23 Issues Eliminated From Detailed Analysis

After reviewing input from public comments and internal scoping, key issues were identified for detailed analysis and evaluation by the interdisciplinary team.

Collectively, the interdisciplinary team and District Ranger did not feel that any of the following issues warranted a separate alternative or further analysis. It has been determined that these issues that are relevant to the project can be addressed through design criteria common, site-specific mitigation measures, silvicultural treatments, timing of the proposed action, and associated Knudsen-Vandenburg (KV) projects.

Other issues that were raised in public comments have been eliminated from further analysis because they are not relevant to the project or its resources or they are beyond the scope of the project.

Effects Of Vegetation Prescriptions On Old Growth – No treatments would occur in old growth stands. In addition, features outlined below in Section 2.5 are designed to protect the integrity of old growth stands next to proposed treatment areas. For these reasons, this issue was eliminated from detailed analysis. See Chapter III-- Forest Vegetation, Environmental Consequences for further discussions on old growth.

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

Effects of Road Closures on Fire Suppression – The location of existing roads not scheduled for closure, in addition to the use of resources such as smokejumpers and helicopters, provides ample opportunity for fire suppression access. All of the temporary roads that are proposed for decommissioning are located at the end of existing gated roads. Most would be created and used only for the life of the project. Existing road segments that are proposed for decommissioning are also located at the end of existing gated roads. Road segments proposed for storage could be easily reopened for suppression activities if needed. For these reasons, this issue was eliminated from further analysis.

Effects of Prescribed Burning on Air Quality – All prescribed burning by the Priest Lake Ranger District is conducted in accordance with the North Idaho Smoke Management Memorandum of Agreement as regulated by the Idaho Department of Environmental Quality. This mechanism is recognized as the best available control of prescribed burning impacts on air quality. This mitigation has a high degree of effectiveness in keeping air pollution from smoke at acceptable levels and ensure that air quality standards would be met. For these reasons, this issue was eliminated from further analysis.

Effects of Vegetation Prescriptions on Visual Quality – All vegetation treatments are designed to meet Forest Plan standards for visual quality retention. Design Criteria are included below to avoid any reduction in visual quality. For these reasons, this issue was eliminated from further analysis.

Loss of Snowmobile Opportunities Due to Decommissioning of Road 1108 – Since all action alternatives propose either constructing an alternate snowmobile route or maintaining the existing route, this issue was eliminated from further analysis.

2.3 Alternatives Considered But Eliminated From Further Study

Based on the Purpose and Need for the project described in Chapter I and the key issues and analysis issues described above, the following alternative was eliminated from further study.

2.31 Alternative E

In order to address the desired future condition of increasing the average patch sizes of young forests and thereby reducing habitat fragmentation, Alternatives B and C were purposely not constrained to avoid openings larger than 40 acres. However, another alternative, Alternative E, was designed to limit the openings to 40 acres or less and to use it as a comparison to the other alternatives to determine how it would affect fragmentation and whether or not it should be considered in more detail.

A landscape pattern analysis tool (FRAGSTATS) was used on the Alternatives, and it was determined that Alternative E would have led to the creation of smaller patch sizes of the young forests compared to Alternatives B and C. Because this was not desirable and would not have met one of the purposes for proposing the project, Alternative E was dropped from further consideration. Additional information is provided in the Vegetation section of the project file.

2.4 Alternatives Considered in Detail

This section describes Alternative B, (the Proposed Action), Alternative C (No Road Construction Alternative), and Alternative D (No Regeneration Harvest Alternative) as developed by the Interdisciplinary Team in response to the issues and 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, heritage resources 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 B, C, and D). A description of the Common Features and Required Design Criteria and Mitigation Features for Alternatives B, C, and D is included later in this Chapter.

2.41 Alternative A - 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 this alternative to look at the changes in the ecosystem that would take place with implementation of any of the other alternatives, as well as the consequences of deferring activities if this alternative were selected.

It is important to keep in mind that "No Action" does not mean there would be no further management in 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 Ongoing and Reasonably Foreseeable Activities that would still occur in the project area is included in Chapter I. Selection of this alternative would defer all the proposed treatment activities.

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 vegetation composition and structure, improve wildlife habitat, or maintain hydrologic function and improve the aquatic resources. Recreation improvements would not occur at this time.

2.42 Alternative B – Proposed Action

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)
- Maintain snowmobile access in the project area

Under Alternative B, 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 (see table 2-1 and figure H-1, Appendix H).

- Vegetation restoration activities would take place on 71 treatment units, totaling 1,640 acres. See below for a description of the silvicultural methods that would be used.
- Fuels treatments would occur on the same 71 units totaling 1,640 acres.
- Ecosystem burns to benefit wildlife would be conducted on three areas totaling 32 acres.
- There would be 2.5 miles of temporary road construction. The entire 2.5 miles would be decommissioned after harvesting, harvest-related activities, and other treatments are complete.
- Approximately 0.7 mile of new road would be constructed to reroute a snowmobile trail out of a riparian area in Consalus Creek.
- Improvements and maintenance of the transportation system (roadside brushing, surface maintenance, etc.) would be made on 58 miles of roads that would be used as haul routes.
- Existing roads to be placed in storage total 30 miles. Existing roads to be decommissioned total 28 miles.

2.42a Silvicultural Treatments

Several silvicultural treatment methods would be used to meet the Purpose and Need for this project.

Group selection prescriptions (uneven-aged management) would create a mosaic of forested openings and thinned areas. The openings would treat the areas in the stand with the highest risk of insect and disease, and amounts of 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 would 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 would be used to increase the overall quality and integrity of the dry site stands. Removing ladder fuels beneath the canopy, and around the large old relic trees would lower the risk of stand-replacing crown fires in the future.

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

Table 2-1. Proposed treatments by alternative (all numbers have been rounded to the nearest acre or mile).

Vegetation Treatments	**Alt A**	**Alt B**	**Alt C**	**Alt D**
Selective cutting	0	800	720	800
Regeneration harvest	0	840	840	0
Ecosystem Burn	0	32	32	32
Total	**0**	**1671**	**1592**	**832**
Logging Systems	**Alt A**	**Alt B**	**Alt C**	**Alt D**
Helicopter	0	592	734	183
Log Forwarder	0	197	197	197
Skyline	0	504	416	194
Skyline / Tractor	0	143	113	64
Tractor	0	203	100	162
Total	**0**	**1639**	**1560**	**800**
Fuels Treatments	**Alt A**	**Alt B**	**Alt C**	**Alt D**
Grapple Pile	0	197	197	197
Lop and Scatter	0	583	503	542
UnderBurn	0	859	859	93
UnderBurn / Lop & Scatter	0	33	33	
Total	**0**	**1671**	**1592**	**832**
Road Work in Miles	**Alt A**	**Alt B**	**Alt C**	**Alt D**
Temp road construction	0	2	0	0
Road Reconstruction	0	58	58	15
Existing Road Storage	0	30	30	30
Existing Road Decommissioning	0	28	26	28
New Road Construction	0	1	0	1

2.42b Fuels Treatments and Ecosystem Burn to Benefit Wildlife

Underburning would have multiple roles in beginning the restoration of historic attributes in the proposed treatment units. Fire would 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) of seral species.

2.42c Openings Greater than 40 Acres

The proposed openings that would exceed 40 acres (Units 2, 4, 12, 13, 15, 17, 18, 19, 33, 51, 56, 57, and 62) have been incorporated into the watershed, wildlife, fire, and visual analysis. The Priest Lake Ranger District is proposing these openings because they are an integral part to ecosystem restoration in the project area. The release of this document will initiate a 60–day public notification period specifically related to the proposed openings. The district is also seeking Regional Forester approval to exceed the 40-acre limit, as stated in the Forest Service Handbook (see the project file).

2.43 Alternative C

Alternative C 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 affects 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; however, it would place some existing roads into storage and decommission other existing roads.

Those proposed vegetation treatment units that would be accessed via the temporary roads proposed in Alternative B 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.

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

- Vegetation restoration activities would take place on 70 treatment units, totaling 1,560 acres
- Fuels treatments would occur on the same 70 units totaling 1,560 acres.
- Ecosystem burns to benefit wildlife would be conducted on 3 areas, totaling 32 acres.
- Improvements and maintenance of the transportation system (roadside brushing, surface maintenance, etc.) would be made on 58 miles of roads to be used as haul routes.
- Existing roads to be placed in storage total 30 miles.
- Existing roads to be decommissioned total 26 miles.

There would be no road construction – temporary or permanent. The snowmobile reroute described in the proposed action Alternative B would not occur. The decommissioning of portions of Road 1108 would be deferred until a suitable alternate snowmobile route is established.

2.44 Alternative D

Alternative D was developed in response to public comments regarding the effects of creating forest openings during regeneration harvests. This alternative describes the expected results of meeting the Purpose and Need of this project while looking at ways to address concerns associated with forest openings. It does not include any regeneration harvests. The restoration of forest composition and structure would be met through a combination of silvicultural treatments and prescribed burning.

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

- Vegetation restoration activities would take place on 30 treatment units, totaling 800 acres
- Fuels treatments would occur on the same 30 units totaling 800 acres.
- Ecosystem burns to benefit wildlife would be conducted on 3 areas, totaling 32 acres.
- There would be 0.3 miles of temporary road construction. The entire 0.3 mile would be decommissioned after harvesting, harvest-related activities, and other treatments are complete.
- The construction of approximately 0.7 miles of new road to reroute a snowmobile trail out of a riparian area.
- Improvements and maintenance of the transportation system (roadside brushing, surface maintenance, etc.) would be made on 16 miles of roads to be used as haul routes.
- Existing roads to be placed in storage total 30 miles.
- Existing roads to be decommissioned total 28 miles.

2.45 Common Features, Required Design Criteria, Mitigation Measures, and Estimated Effectiveness for All Action Alternatives

Design criteria direct the location and extent of the proposed activities. **Mitigation measures** are designed to reduce the environmental effects of the proposed activities.

The resource specialists and interdisciplinary team members predicted the effectiveness of the mitigation measures. In general, effectiveness ratings are based on literature and research, administrative studies, professional experience and logic, and results of previous monitoring.

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 in Chapter III assumes their implementation. Many of these criteria are addressed through language in the timber sale contracts; the Sale Administrator monitors them for compliance.

2.45a Features Included in Standard Timber Sale Contract Clauses

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

1. Heritage 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. Provisions for protection of cultural resources are included in all contracts and have been effective in protecting cultural resources (USDA 2000, p. 2).

2. Improvements and Survey Monuments

Survey monuments, landlines, and all other improvements would 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.

3. Habitat of Threatened, Endangered, or Sensitive Species (TES)

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 used in all contracts, and Forest Plan Monitoring and Evaluation Reports show they have been effective in protecting these resources (USDA 2002, USDA 2001, USDA 2000, USDA 1999, USDA 1998).

4. 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 would 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.

5. Best Management Practices

Implement site-specific Soil and Water Conservation Practices as listed in Appendix A. These BMPs for units, roads, and landings are designed to meet or surpass the Clean Water Act and the level of Idaho State Best Management. They are designed to protect soil resources, water quality and fisheries habitat. Practices selected for watershed protection are 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 and fisheries biologist.

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. 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.

6. Public Health and Safety

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 would 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. Signing shall comply with the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

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

(c) *Timing of Operations* – In areas with groomed snowmobile routes, logging activities and timber hauling during the winter would be scheduled to avoid conflicts on groomed snowmobile routes.

Estimated Effectiveness – High. Contract provisions for timing and scheduling of operations have been effective.

7. Noxious Weeds

Noxious weed treatment would be conducted according to guidelines and priorities established in the Priest Lake Weed Control Project FEIS (USDA 1997). Methods of control may include biological, chemical, mechanical, and cultural.

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

b) *Gravel or borrow pits* - Gravel or borrow pits to be used during road construction or reconstruction would be free of new weed invader species (as defined by the IPNF Weed Specialist). A list of weed species considered potential new invaders is included in the project file.

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

d) *Sites of New Construction* – All 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* – All straw or hay used for mulching or watershed restoration activities would be certified "Weed Free."

f) *Decommissioned or Stored Roads* - Road segments identified for weed treatment and proposed for obliteration would be treated prior to obliteration.

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, estimated effectiveness is moderate; the measures are expected to be somewhat effective at reducing the spread of these in the project area. The effectiveness of treatments on National Forest lands could be reduced if adjacent landowners do not treat their weed infestations.

8. Road Reconstruction and Maintenance

A road package for improvement, construction, reconstruction, and maintenance would include the site-specific state Best Management Practices criteria listed in Appendix A 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.

Road construction and reconstruction shall meet the requirements of the "Forest Service Specifications for the Construction of Roads and Bridges," (April 1985) and as revised by approved Special Project Specifications.

Estimated Effectiveness – High. Timber sale and road construction contracts are effective in designing for and accomplishing the requirements.

9. Soils and Site Productivity

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).

Spacing between skid trails 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.

When logging operations are conducted during the winter, skid trail spacing less than 100 feet may be used when logging occurs on at least two feet of snow, or on frozen ground.

Estimated Effectiveness: High. Forest Plan monitoring has shown these measures are effective at reducing detrimental impacts (Niehoff 2002).

10. Watershed and Fisheries

No commercial timber harvest would be conducted within Riparian Habitat Conservation Areas (RHCAs) as specified in BMP 14.03 listed in Appendix A. These practices comply with fish habitat protection standards and guidelines in the Inland Native Fish Strategy (INFS.) All action alternatives include stream protection zones that meet or exceed INFS requirements. See Appendix B for more information concerning RHCAs.

Estimated Effectiveness -- High. Stream protection zones (Streamside Management Zones) have been shown to be effective in moderating cumulative watershed effects (Belt et. al. 1994). See the discussion on Best Management Practices for more information.

Stream buffer widths for RHCAs within the project area are based on INFS. Riparian management objectives would be met in all activities associated with this project. The zones where commercial timber harvest would not be allowed are as follows:

300-foot (slope distance) protection zone for streams that have fish,
150-foot protection zones for perennial streams without fish,
50-foot buffers for intermittent streams and
50-foot buffers for sensitive landtypes.

Estimated Effectiveness – High. These standards and guidelines have a high effectiveness at maintaining the integrity of aquatic ecosystems. Applicable INFS standards and guidelines are addressed in Appendix B.

2.45b Features Not Included in Timber Sale Contracts

1. Threatened, Endangered, and Sensitive (TES) Plants

TES plant surveys would be conducted as needed prior to treatment activities.

All currently documented sensitive plant occurrences would be buffered from harvest activities. The buffers would be established by the project botanist. 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 adequate buffers around documented occurrences, as determined by the project botanist and based on topography, extent of contiguous suitable habitat for documented occurrences and the type of treatment proposed
- Modifying harvest methods, fuels treatment or logging systems to protect TES plants and their habitat
- Implementing, if necessary, Timber Sale Contract provisions for Protection of Endangered Species, and Settlement for Environmental Cancellation.

Estimated Effectiveness - High; the measures would protect documented occurrences of western goblin (*Botrychium montanum*), triangle moonwort (*B. lanceolatum*), deerfern (*Blechnum spicant*) and groundpine (*Lycopodium dendroideum*). Protection of identified moonwort populations from ground or canopy disturbance would preserve critical soil mycorrhizae and overstory canopy cover.

Buffering the occurrence of northern starflower (*Trientalis arctica*) would also protect its paludified forest habitat from the direct effects of project activities. Such measures have been used in previous timber sale projects, including Ruened Salvage (1998), BlueGrass Bound (1997) and Skin (1997).

2. Public Health and Safety

For local air quality reasons, restrictions on prescribed burning may be implemented by the Priest Lake Ranger District in addition to those imposed by the North Idaho Airshed Group

Estimated Effectiveness - High. The Idaho Department of Environmental Quality recognizes the North Idaho Smoke Management Memorandum of Agreement (MOA 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.

3. Soils and Site Productivity

A variety of slash disposal methods would be utilized (underburning, grapple piling, and lop and scatter). Enough slash would be left in various sizes to meet coarse woody debris guidelines and to provide for soil nutrients retention. The slash, except for landing slash would be allowed to cure over winter prior to any mechanical disposal activities to allow enough time for the bulk of nutrients to leach from the foliage into the soil. The decision to use a particular method would be based on individual stand objectives.

Estimated Effectiveness - High. Based on research recommendations, this measure is highly effective in maintaining long-term soil productivity (Graham et al. 1994).

4. 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 past 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 soil standards).

In most cases, tops would not be yarded to landings. The slash would remain in the woods to avoid removing nutrients in the foliage from the site. See soil productivity measures discussed above.

A Forest Service representative on logging operations would conduct a pre-work conference. Special conditions of the contract would be reviewed in advance. 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 would be monitored by the Forest Service Sale Administrator.

Estimated Effectiveness – High. Timber Sale Contract provisions for these resources have been effective in protecting natural resources. See above for a description of standard timber sale contract provisions.

5. Vegetation

Silvicultural Prescriptions – All vegetation treatments would have silvicultural prescriptions approved by a certified Silviculturist before treatment. Prescriptions would consider site-specific factors such as physical site, soils, climate, habitat type, current and future vegetative composition, and conditions. They would also consider interdisciplinary objectives, NEPA decisions, other regulatory guidance, and Forest Plan goals and standards.

All areas planned for regeneration would be reforested with site-adapted species/seed source and resulting stands would be dominated by appropriate long-lived seral species. In treated areas, site preparation for regeneration, fuel treatment and planting would occur within 5 years of regeneration treatment.

Estimated Effectiveness – High. These measures meet IPNF Forest Plan standards, Northern Region, and National Office direction.

6. Fuels Treatment

Where machine piling is prescribed for fuel reduction, one slash pile per five acres would be left unburned to provide habitat for small forest animals (e.g. snowshoe hares).

If nesting by raptor species is found in an area scheduled for prescribed burning or silvicultural manipulation, activities would modified as recommended by the district wildlife biologist, to avoid impacts to the species.

Estimated Effectiveness – High; using monitoring by Timber Sale Administrators and District Wildlife Biologists, this feature would have a high likelihood of achieving the desired objectives.

7. Sediment Reduction

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.

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).

8. Protection of Threatened, Endangered and Sensitive Wildlife Species

In addition to the protections provided under the timber sale or road construction contracts, the following safeguards would be used:

- Modifications to activities or identification new locations of any TES prior to, or during, project implementation would be reported to the district wildlife biologist so appropriate measures can be taken for habitat protection.
- Determination of project modifications necessary to protect the species and its habitat would be based on applicable laws, regulations and management recommendations for the species. Measures may include the necessary steps to retain habitat and prevent disturbance according to recovery plans or conservation strategies.

Estimated Effectiveness - High; using monitoring by Timber Sale Administrators and District Wildlife Biologists, this feature would have a high likelihood of achieving the desired objectives.

a. Flammulated Owl Habitat Protection Measures

Activities have been designed to avoid habitat that is considered suitable for flammulated owls. Activities within capable habitat for flammulated owls would be designed to accelerate the development of suitable habitat conditions for this species. Harvest prescriptions would:

- Retain an overstory canopy closure between 35 and 65 percent.
- Achieve 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.
- Retain a minimum of one patch (approximately $1/10^{th}$ 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.

Surveys to determine the presence of flammulated owls would be conducted throughout the implementation phase of the project. Activities would not be implemented within habitat considered as occupied by flammulated owls.

Estimated Effectiveness - High; using monitoring by Timber Sale Administrators and District Wildlife Biologists, this feature would have a high likelihood of achieving the desired objectives.

9. Snag Retention and Replacement

Region One protocol for snag retention would be met or exceeded (USDA 2000) where these or higher levels exist. To meet the objectives listed in table 2-2, the following guidelines would be followed in addition to the Snag Protocol:

- Snags that show signs of decay, loose bark, or broken tops would not be designated for harvest. Exceptions would be made for road construction and log landings.
- The IPNF Reserve Tree Guide (1995) would be followed to reach objectives of the Snag and Woody Debris Guidelines (USDA 1987, Appendix X) and worker safety. Where they exist, the diameters of these snags and live wildlife leave trees would all be greater than 12-inches diameter at breast height (dbh) with 25% of them greater than 20-inches dbh.
- Tree marking guidelines for wildlife reserve trees would favor the retention of large diameter trees, particularly hollow and broomed trees except when they pose a safety concern. Western larch, ponderosa pine, and western red cedar greater than 20 inches dbh would be marked as first choices for snags and reserve trees.
- Snags cut for safety reasons would be left in the unit - preferably where they fall.

- Silvicultural and burning prescriptions would be prepared with the goal of protecting snag and green tree replacement snags, and retaining recommended levels and distribution of coarse woody material during site preparation and fuels treatment.

Table 2-2. Snag Guidelines

VRU Cluster	Range of averages of snags/ac from Forest Inventory and Analysis data	Adjusted snag/acre retention prescriptions
1	0.6-1.6 (large snags only)	1-2 >20" dbh
2	0.8-5.1	4 > 20" dbh
3	3.6-7.8	6-12 total, w 2-4 > 20" dbh
4	6.2-11.8	6-12 total w/ 2 > 20" dbh
5	9.4-12.1	12 total w/ 4 > 20" dbh
6	6.1-9.5	5-10 >10" dbh
7	1.3-3.7	all available

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. A variety of strategies would be considered to treat fuels on moderate slopes where residual snags would be at risk from broadcast burning.

Estimated Effectiveness - High; using monitoring by Timber Sale Administrators and District Wildlife Biologists, this feature would have a high likelihood of achieving the desired objectives.

10. Vegetation Screen

Vegetation buffers would be left along open roads and next to regeneration treatments where there is a realistic chance of creating buffers from logging and fuel treatments. This measure is designed to provide security screening for wildlife and minimize unscheduled 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.

11. Grazing Allotment Features

There are two existing grazing allotments within the project area. The lower allotment includes lands in the lower valley of the Upper West Branch extending from about the Washington-Idaho state lines west to the edge of Highway 57, north to the Binarch Divide and southwest to include the valley bottoms of Goose Creek. The second allotment begins at the state line and includes the valley bottoms of the Upper West Branch from about the confluence of Tola Creek up to the confluence of the Upper West Branch with an unnamed tributary in Section 14, T36N, R45E. Both of these allotments are scheduled for reanalysis in the near future.

Understanding that this document is not a decision-making tool for those allotments, the following design criteria were developed with the goal of minimizing the potential conflict between the proposed actions associated with any of the action alternatives and the cattle allotments, as they currently exist.

Mitigation would include the following measures as necessary:

- Changing cutting boundaries to retain natural barriers and deter increased access to riparian areas.
- Installation of, or moving, cattle guards and drift fences to control cattle movement.
- Where prescribed burning is planned, coordination with permittees at least a year or more in advance so that, if necessary, burned areas can be temporarily fenced to exclude cattle, or other provisions can be made for keeping cattle off burned areas until vegetation has recovered.
- Obliterated roads would have treatments that discourage cattle access for at least five years after obliteration. Whenever possible, natural materials such as angular rock and large woody debris would be used to discourage access on raw, treated slopes.

Estimated Effectiveness - High, if the features are properly designed, implemented and maintained.

12. Visual Quality Objectives (Scenery Management) Features

The following measures are recommended design criteria for units 52, 58, 67, 68, which are in Partial Retention VQO:

- Mark trees on the side that faces away from the road.
- After unit is logged, remove boundary flagging and signs.
- Stumps within 50 feet of the road should be cut as close to ground level as possible with the remainder of the stumps cut to no more than 12 inches in height.

Unit 65 is more visually sensitive, although it is also in an area classified as Retention. The following design criteria would apply to Unit 65:

- Do not remove any ponderosa pine, unless they pose a hazard to the logger.
- Design for non-uniform spacing of trees to achieve "feathering" of any edges at areas of tree removal.
- Remove no more than 20 percent of the existing overstory cover.
- Lop and scatter slash – no burning of slash will be allowed.
- Tree removal should be limited within 100 feet of the ridge top to avoid changing the uniform canopy cover along the ridgeline.

13. Heritage Resources

All areas proposed for activities have been included in heritage site inventories. No identified heritage properties are in or adjacent to proposed activity areas. Approximately 5,000 acres of the project area has not had heritage site inventories. None of this acreage is currently proposed for any activities. Any future proposed activities in uninventoried areas would require inventories.

2.46 Monitoring

2.46a Forest Plan Monitoring

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.

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 at http://www.fs.fed.us/ipnf/eco/manage/forestplan 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.

2.46b Project 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 items 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 (MOA 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 provisions to protect heritage resources are used 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) 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 (construction, reconstruction and obliteration) contract specifications are followed. The district hydrologist would also provide technical assistance and review as needed. BMP effectiveness would be monitored following at least one runoff season after BMP implementation.

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. Forest Service wildlife personnel would conduct the monitoring.

5) Noxious Weeds: Pretreatment of roads and equipment as proposed 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 Priest Lake Noxious Weed Control Project FEIS. Forest Service personnel would conduct the monitoring.

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. A qualified botanist would perform the monitoring.

2.5 Comparison of Alternatives

Table 2-3 presents a comparison of alternatives focusing on the key and analysis issues for this project. These issues are compared between alternatives using quantitative or Qualitative analysis indicators.

Table 2-3. Comparison of Alternatives by Issue Indicator

Issue Indicator - Vegetation **EFFECTS OF PROJECT ACTIVITIES ON FOREST VEGETATION (ACRES)**	**Alternative A (existing condition)**	**Alternative B**	**Alternative C**	**Alternative D**
Forest Composition)				
Desirable Species				
Western Larch	2,295	+552	+552	+55
White Pine	1,860	+340	+340	+74
Ponderosa Pine	500	+196	+196	+107
Total	**4,655**	**+1,088**	**+1,088**	**+236**
Undesirable Species				
Douglas-fir	8,686	-822	-822	-125
Hemlock	8,396	-150	-150	-37
Cedar	11,882	-108	-108	-74
Lodgepole pine	2,157	-40	-40	-30
Subalpine fir	2,583	-37	-37	-37
Grand fir	4,802	+69	+69	+67
Total	**38,506**	**-1,088**	**-1,088**	**-236**
Forest Structure				
Shrub/Seed/Sap	9,964	+787	+787	+16
Pole/Small	3,598	no change	no change	no change
Immature/Medium	12,634	-283	-283	-110
Mature/Large	9,922	-504	-504	+94
Old Growth	7,584	no change	no change	no change
Forest Pattern (Average Patch Size)				
Shrub/Seed/Sap	53.6	56.1 (+5%)	56.1 (+5%)	54.4 (+1%)
Pole/Small	47.4	no change	no change	no change
Immature/Medium	93.7	91.2 (-3%)	91.2 (-3%)	93.4 (-<1%)
Mature/Large	84.8	74.6 (-12%)	74.6 (-12%)	82.8 (-2%)
Old Growth	154.7	no change	no change	no change

Issue Indicator – TES Plants	Alternative A	Alternative B	Alternative C	Alternative D
EFFECTS OF PROJECT ACTIVITIES ON THREATENED, ENDANGERED, SENSITIVE PLANTS Relative amount of canopy opening and ground disturbance in and next to known plant populations or suitable habitat.	No impacts to any TES or Forest species of concern or suitable habitat.	All known occurrences of sensitive moonworts would be buffered. Undetected individual moonworts could be impacted; however, these impacts would not lead to the listing or loss of population or species viability.	Same as Alternative B with regard to canopy opening but slightly less risk of impacts with less ground disturbance due to lack of road construction.	Less risk of impacts to undetected individual moonworts than Alternative B or C because fewer acres would be treated.

Issue Indicator – Noxious Weeds	Alternative A	Alternative B	Alternative C	Alternative D
RISK OF PROJECT ACTIVITIES ON THE SPREAD OF EXISTING NOXIOUS WEED POPULATIONS AND INTRODUCTION OF NEW WEED INVADERS Relative amount of ground disturbance	No change in the risk or rate of weed spread because no ground disturbance would occur.	There is a risk of weed spread from ground-disturbing activities. The risk of introduction and establishment of new weed invaders to the project area is expected to be low.	Similar to Alternative B but slightly less risk of weed spread because no new roads would be constructed	Less risk of weed spread or introduction of new weed invaders than Alternative B or C because fewer acres would be treated.
Relative amount of canopy removal	No change in the risk of weed spread because there would be no canopy removal.	Oxeye daisy has a low to moderate potential for spread.	Same as Alternative B	Less risk of weed spread or introduction than Alternatives B or C because fewer acres would be treated and virtually no regeneration harvest would occur.

Issue Indicator - Wildlife	EFFECT OF PROJECT ACTIVITIES & ROAD MANAGEMENT ON WILDLIFE HABITAT AND SECURITY AS RELATED TO THREATENED, SENSITIVE AND MANAGEMENT INDICATOR SPECIES	Alternative A (existing condition)	Alternative B	Alternative C	Alternative D
Canada lynx	Percent of key habitat components (denning, forage and unsuitable)	25% denning 66% foraging 9% unsuitable	25% denning 66% foraging 9% unsuitable	25% denning 66% foraging 9% unsuitable	25% denning 66% foraging 9% unsuitable
	Changes in winter recreational activities within LAUs.	52 miles	55 miles	52 miles	55 miles
Grizzly bear	Changes in open and total road densities and key habitats.	3.4m/m2	3.3m/m2	3.3m/m2	3.2m/m2
Flammulated Owl	Percent change in habitat suitability	2.7%	5.4%	5.4%	4.6%
Northern goshawk	Percent of suitable nesting habitat	22%	22%	22%	22%
Fisher	Percent of suitable habitat	26%	25%	25%	25%
Pileated woodpecker	Changes to and availability of large snag habitat.	42%	40%	40%	41%

Issue Indicator - Soils	Alternative A	Alternative B	Alternative C	Alternative D
EFFECTS OF PROJECT ACTIVITIES ON SOILS Percent of detrimentally disturbed soils	No change in detrimentally disturbed soils beyond current conditions	Total Acres of Impacts = 81 Total Activity Acres = 1,671 Total % Impacts = 2.4% No area exceeds 15% limit for detrimental impacts	Total Acres of Impacts = 61 Total Activity Acres = 1,592 Total % Impacts = 1.5% No area exceeds 15% limit for detrimental impacts	Total Acres of Impacts = 63 Total Activity Acres = 832 Total % Impacts = 5.8% No area exceeds 15% limit for detrimental impacts
Potential for loss of potassium and coarse woody debris (CWD)	No loss of potassium or woody debris unless there is a lethal stand-replacing fire	Some loss of potassium with removal of trees. Mitigation to leave branches and needles over winter and to leave CWD will reduce loss.	Same loss of potassium with removal of trees as Alt. B. Mitigation to leave branches and needles over winter and to leave CWD will reduce loss.	Less loss of potassium with removal of trees than Alts. B & C. Mitigation to leave branches and needles over winter and to leave CWD will reduce loss.

Issue Indicator – Aquatics	Alternative A	Alternative B	Alternative C	Alternative D
EFFECTS OF REGENERATION CUTTING AND ROAD CONSTRUCTRION ON WATER YIELD Percent change in magnitude, intensity and duration of water yield.	No change from existing condition.	1% increase	1% increase	No change from existing condition.
Changes in stream channel morphology.	No change from existing condition.	No change from existing condition.	No change from existing condition.	No change from existing condition.
EFFECTS OF REGENERATION CUTTING AND ROAD CONSTRUCTION ON SEDIMENT YIELD. Percent change in magnitude of sediment yield. Total estimated sediment delivery in tons over the duration of the project. Overall sediment reduction in tons.	No change from existing condition.	An estimated 4% increase in sediment yield would occur the first year, then decline to current levels in 2 years for a total of 18 tons over 10 years. Sediment input is not expected to negatively affect stream channel, fish habitat, or populations. Overall estimated net sediment reduction = 7,000 tons.	An estimated 3% increase in sediment yield would occur the first year, then decline to current levels in 2 years for a total of 14 tons over 6 years. Sediment input is not expected to negatively affect stream channel, fish habitat, or populations. Overall estimated net sediment reduction = 7,000 tons.	An estimated 3% increase in sediment yield would occur for the first year, and then decline to current levels in 2 years for a total of 14 tons over 6 years. Sediment input is not expected to negatively affect stream channel, fish habitat, or populations. Overall estimated net sediment reduction = 7,000 tons

CHAPTER III – Affected Environment and Environmental Consequences

3.1 Introduction

This chapter presents two levels of analysis for each resource issue described: the existing conditions within each resource's affected environment, and the potential effects of the alternatives on each resource. The Affected Environment section provides general information about the resource described and establishes a baseline against which effects of the alternatives may be compared. The Environmental Consequences section discloses the potential direct, indirect, and cumulative effects of the alternatives on each resource.

In this analysis, direct and indirect effects are described for those activities that are proposed to occur on National Forest lands. Cumulative effects consider the effects of past, present and reasonably foreseeable activities on both Federal and non-Federal lands, in addition to the direct and indirect effects of proposed project activities. Each resource analyzed has a defined cumulative effects analysis area, which may be different for each resource.

3.2 Forest Vegetation

3.21 Regulatory Framework

The laws and regulations applicable to the management of forest vegetation include the Washington and Idaho State Forest Practices Act, Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), National Forest Management Act of 1976 (NFMA), Idaho Panhandle National Forests Plan (USDA 1987) and Forest Service policy. Specific regulations and additional details are provided in Appendix C.

3.22 Scientific Findings from Larger Scale Ecosystem Assessments

The following section provides a summary of findings that relate to forest vegetation that were made from three large to mid-scale ecosystem assessments. These assessments provide a perspective on forest vegetative conditions and trends over larger areas and helped to identify the scope and focus of this analysis. Conditions within the analysis area were compared to findings at the larger scales and this process helped to develop the general desired conditions and the management activities that could be used to trend the vegetation towards those conditions.

3.22a Columbia River Basin

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) Scientific Assessment evaluated the public lands administered by the USDA Forest Service and USDI Bureau of Land Management within Eastern Oregon, Eastern Washington, most of Idaho, and the western-most section of Montana. The Chips Ahoy project lies within lands classified as Forest Cluster 4 in the Scientific Assessment. The forests within this area were rated low for forest integrity. The primary risks to forest integrity in this area were identified as forest compositions susceptible to insect, disease and fire, as well as risks to late and old forest structures in managed areas. Opportunities to address these risks were identified as treatment of forested areas to reduce fire, insect, and disease susceptibility, and restoration of late and old forest structure in managed areas (Quigley, Haynes and Graham 1996, pp. 113, 115,116).

Throughout the Interior Columbia Basin, disturbances such as fire and insect mortality have played an important role in determining forest tree composition (Quigley and Arbelbide 1997). Within northern Idaho and eastern Washington, the most significant historic natural disturbance was fire. The Assessment also reports that in addition to natural disturbance, land management activities and introduced pathogens have dramatically altered the species and age composition of trees in the overstory. Historically, coniferous tree composition in the Interior Columbia Basin was dominated by species such as ponderosa pine, western larch, and western white pine. These long-lived tree species were typically established after some form of disturbance and have the potential to occupy a site for 200-300 years. Many of the local natural disturbances not only initiated these long-lived species, but also maintained them in mature conditions. Stands of these trees were adapted to regenerate in and survive local fire regimes. Other disturbances, such as historic levels of insect populations and wind and winter storm damage, contributed to stand mortality. As trees died, they became fuel for fires and over time created conditions for large stand-replacing fires.

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

3.22b Northern Region Overview

The Northern Region Overview (USDA 1998) considered and incorporated findings from the ICBEMP and the Northern Great Plains Assessments and focused on priorities for restoring ecosystem health and availability of recreation opportunities. Some of the findings of the overview pertinent to vegetative conditions in the project area are:

- Due to interaction of agents such as blister rust and mountain pine beetle, followed by salvage harvests since the 1930s, over 95 percent of the white pine type has changed to grand fir, Douglas-fir, and western red cedar/western hemlock cover types with an associated change to a largely mid-seral stage structure. Without an effective restoration effort using genetically improved/resistant western white pine stock, paired with an aggressive planting program, further interactions with agents of change will effectively eliminate white pine as a cover type.

- The risk regionally is high for a continued loss of western larch cover type and emergent structure due to the lack of low intensity, periodic disturbance, and the shift toward stand-replacing fire.

- Current structures are typified by mid- to mature age/size classes with relatively few areas in the seedling and sapling structural stage. In northern Idaho and western Montana typical stand structure and composition is multi-layered; comprised primarily of Douglas-fir and grand fir. The areal extent of the Douglas-fir cover type has increased greatly, with an associated increase in mid-seral species. This is a result of a combination of fire exclusion, selective harvest of large early-seral species, and especially the loss of western white pine. An increase in root disease has correspondingly reduced the productivity and health of forests in northern Idaho and western Montana in this type as a higher percentage of the most susceptible host species (Douglas-fir and grand fir) exist today.

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". 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…"

3.22c North Zone Geographic Assessment

Because of the local variation in landscape change throughout the Columbia Basin, the Idaho Panhandle National Forests (IPNF) is in the process of completing a Geographic Assessment (GA) for the northern zone of the Idaho Panhandle National Forests. The assessment covers three subbasins; Priest River, Pend Oreille, and Kootenai. The purpose for developing the GA was to develop a scientifically based understanding of the processes and interactions occurring in the Subbasins so that activities can be developed to promote healthy and resilient ecosystems.

The assessment identifies ecosystem trends and changes in vegetation over the last 100-200 years. Findings of the geographic assessment are similar to those of the Northern Region and Interior Columbia Basin Assessments, but provide more specific information on lands in the Subbasin Ecosystems. Although the geographic assessment is still in draft form, data that have been compiled for the assessment are used throughout this chapter to compare with the project area. Tables, graphs and characterizations that contain information from the GA are cited as "USDA draft in progress" throughout this document.

In addition to analyzing the vegetative conditions across the entire Priest River Subbasin, the GA also considered conditions within smaller geographic areas- typically one or more watersheds. In regards to the Upper West Branch watershed (as well as the Lower West Branch), findings in the assessment conclude that this area:

> "….. has been extensively altered by a combination of blister rust, past timber harvest practices, and fire suppression. Particularly notable is the conversion of formally extensive white pine and larch forest types to dense stands of Douglas-fir, grand fir, cedar, and hemlock. The drier habitat types on south and west facing spur ridges have been particularly impacted by fire suppression, with conversions from open ponderosa pine to dense Douglas-fir and grand fir. Damage from weather events, root pathogens and bark beetles have been increasing in these areas, and fire risks are growing" (USDA draft in progress, p. 27).

The GA identifies the majority of the forests within the Chips Ahoy project area as being within a low integrity/high risk landscape. These areas are the most heavily altered from historic conditions and contain the greatest need and opportunity for large-scale vegetation restoration. These types of landscapes have the following characteristics:

- These areas 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 combination of root diseases and bark beetles begin to create high mortality.
- Dense and multi-storied stands of Douglas-fir or true firs dominate the dry habitat types.
- Current forests are dominated by shade-tolerant, drought-and fire-intolerant species (grand fir, western redcedar, and western hemlock), and short-lived seral species (lodgepole pine and Douglas-fir).
- There is a growing risk of wildfire as a result of natural fuels accumulations.

The GA also identified management strategies that could be used for restoration within these low integrity/high risk landscapes. The following is a list of the management objectives that are most relevant to the Chips Ahoy project:

- Use both regeneration harvest and prescribed fire to create openings where potentially long-lived seral tree species (ponderosa pine, white pine, and larch) are lacking and implement appropriate silvicultural practices to assure regeneration of these species – including blister rust resistant white pine;
- Lower the risk of large, severe disturbances by:
  -- Restoring potentially long-lived early seral trees species (ponderosa pine, western larch, and blister rust-resistant white pine) on appropriate sites;

  -- Reducing the extent of drought and fire intolerant forest types (grand fir, western hemlock, western redcedar) on sites where they are not well adapted, and are likely to be drought stressed (south aspects, shallow soils, some upland sites);

  -- Reducing the extent of short-lived early seral forest types (Douglas-fir and lodgepole pine) that are at or near pathological rotation age;
- Use commercial thinning, thinning from below, shelterwoods with reserves, and prescribed fire to sustain and favor larch and ponderosa pine where they are present, and regenerate them where appropriate;
- Use weather, insect, and pathogen disturbances as opportunities to begin regeneration of potentially long-lived early seral tree species (ponderosa pine, western larch, and blister rust-resistant white pine);
- In existing young stands, favor potentially long-lived early seral tree species, manage density, and manage blister rust through pre-commercial thinning, pruning, and other appropriate stand tending activities;
- Restore large-scale diversity in landscape pattern by increasing patch size of both early and late successional patches; while providing for a large variety of patch sizes.

3.23 Affected Environment

3.23a Methodology

Information that was used to describe the affected environment comes from a variety of sources. Historical conditions and ecological processes were assessed using information from the large and mid-scale ecosystem assessments that were discussed above and from other sources that are cited. The data and literature sources that were used to develop the findings that are presented in the GA (USDA draft in progress), as well as other information sources are located in the Vegetation section of the project file.

Information on existing conditions of National Forest System lands for habitat types, forest cover types, forest structural stage, origin, past harvest activity, etc. are based on the Timber Stand Management Record System (TSMRS) database and field surveys of the proposed treatment areas. The information in the database was developed from stand exams, historical records and aerial photo interpretation. Information regarding existing vegetative conditions on private lands is based on aerial photo interpretation and observations made by project team specialists in the area. Information on current and foreseeable private land activities was acquired from Idaho Department of Lands and Washington Department of Natural Resources. Aerial photo interpretation (using the 2002 flight) was used heavily to estimate stand structures on these private lands while the forest type was estimated primarily by a "nearest neighbor" approach.

With one exception that is discussed below, the cumulative effects analysis area that was selected for forest vegetation is the Upper West Branch watershed (see figure H-17 in Appendix H). This watershed is approximately 45,000 acres in size. The stand replacement wildfire events that historically occurred in north Idaho were often tens of thousands of acres in size and these fires were the most significant events in shaping the forests (USDA draft in progress, p. 5; Zack and Morgan 1994). Therefore, when discussing historical landscape patterns and disturbance agents, an area the size of the Upper West Branch drainage is an appropriate scale. However, when discussing the issue regarding old growth and Forest Plan standards, a different analysis area was used. For those discussions, the upper most portion of the watershed was not considered because it occurs within a roadless area and there are no proposed activities that would occur within that area. Instead, the analysis area that was used included the combined area that is occupied by the six old growth management units (units #11, 12, 16, 17, 18 and 28) that occur within the Chips Ahoy Project Area (see Vegetation section of the project file).

3.23b Forest Vegetation Overview

1. Introduction

The following overview presents a summary of the forested habitat types that occur within the area and the historical and current factors that have influenced the forests. This overview is followed by a more detailed description of the existing and historical composition, structure and pattern of forests in the Upper West Branch watershed as compared to the Priest River Subbasin.

Vegetation is a fundamental part of terrestrial ecosystems. Vegetation is a basic element of wildlife habitat and is a critical factor regulating hydrologic regimes. The composition and structure of the vegetation that exist in the ecosystem is a function of climate, the physical site, the plant species available in an area, the disturbance history, and the successional processes that follow disturbance. Most landscapes are a mosaic reflecting the interaction between disturbance history and forest succession. This interaction is a keystone process shaping the landscape vegetation mosaic (Zack and Morgan 1994).

The vegetation in northern Idaho is largely a result of the productive ash cap soils and the prevailing climatic pattern. The climatic pattern is characterized by westerly winds that carry maritime air masses from the northern Pacific across the northern Rocky Mountains during winter and spring. Precipitation occurs mainly between November and February. The inland maritime airflow provides northern Idaho with abundant moisture (25-55 inches per year) and moderate temperatures.

2. Habitat Types

Forest vegetation in northern Idaho and in the Upper West Branch watershed is shaped by several complex physical and environmental factors. To simplify the measurement of some of these physical and environmental factors, a classification system called habitat typing is used. Habitat types are based on natural relationships and reflect ecological patterns and the capability of vegetation on a site.

The designation of habitat types and the classification of forest stands were established to characterize vegetation based on potential climax conditions. Climax conditions represent the culmination of overstory and understory plant succession without disturbance. Because climax species, by definition, are those species that are self-perpetuating in the absence of disturbance, and because disturbances are relatively common on most sites, the occurrence of climax conditions is rare (Cooper et al. 1991).

Although every habitat type is unique in some way, habitat types can be grouped based on similarities in natural disturbance regimes, successional pattern, and structural characteristics of mature stands (USDA 1997a). In an effort to categorize vegetation responses to disturbance (primarily fires), and to describe potential forest cover types capable of dominating these sites, habitat types in the Upper West Branch watershed have been aggregated into four habitat type groups - dry, moist, cool/moist and cool/dry (see table 3-1).

Information on habitat groups is derived from Fire Ecology of the Forest Habitat Types of Northern Idaho (Smith and Fischer 1997) and Biophysical Classification – Habitat Groups and Descriptions (USDA 1997a).

Moist Habitat Type Group **–** Habitat types within this group account for 90 percent of the Upper West Branch watershed and 83 percent of the Priest River Subbasin. These are the most common habitat types found on mid-elevation sites in the mountains of north Idaho (see table 3-1). Habitat types of this group include the moistest of the grand fir series, and the majority of the western hemlock and cedar habitat types. Grand fir, western hemlock, western redcedar, and Douglas-fir trees dominate these sites today. However, prior to the introduction of the blister rust disease, these sites were known as the "white pine type" since over 40% of the sites were dominated by white pine. Today, only four percent of the Priest River Subbasin and five percent of the Upper West Branch watershed is classified as a western white pine forest type (USDA draft in progress).

Large stand-replacing fire intervals were approximately 200 years on these moist habitat type groups (Zack and Morgan 1994). Between these large stand-replacement fires, typically there would be mixed-severity fires occurring every 55-85 years. The large lethal fires often provided fuel for a reburn a few decades later. Double and triple burns were once common on these landscapes.

Dry Habitat Type Group – This habitat type group accounts for approximately three percent of the Upper West Branch Watershed and four percent of the Priest River Subbasin. The dominant forest vegetation in this group consists primarily of Douglas-fir, grand fir, ponderosa pine and western larch. Very dry sites within this habitat group were historically dominated by large, old ponderosa pine or Douglas-fir, with canopy cover often less than 30 percent and seldom reaching 50 percent. Historically, grasses and low shrubs dominated the understory and were maintained by low-severity fires that tended to occur at intervals of 10 to 30 years (Smith and Fischer 1997). Downed woody fuels consisted of widely scattered, large trees, twigs, branches, and cones; often the most abundant surface fuel was cured grass. Before the 20th century, these sites were characterized by frequent underburns that eliminated most tree regeneration, thinned young stands, and perpetuated open stands dominated mainly by ponderosa pine.

The more common, moderately dry forests in this habitat type group are also often open-canopied, although canopy cover could exceed 50 percent. Ponderosa pine and Douglas-fir dominate the overstory, with western larch as a co-dominant on slightly moister sites. The species composition and structure of moderately dry forests is dependent largely on the frequency and severity of fires. Historically, low-severity fires at intervals of less than 50 years maintained a high, open canopy in these stands and perpetuated dominance by ponderosa pine.

Very long fire-free intervals have in many cases produced mature stands with few ponderosa pines or western larch. While large Douglas-fir can survive low-intensity fires, the dense understory and ladder fuels resulting from absence of fire increase the potential for lethal, or stand-replacing fires. Moister forests within this group historically burned frequently enough to maintain a structure dominated by ponderosa pine and larch. Where fire has been excluded for a very long time ponderosa pine and larch have gradually declined, with Douglas-fir persisting in the overstory.

In the old growth stage of stand succession, ponderosa pine, Douglas-fir, and western larch stands are usually single-storied and open-canopied (Green et al. 1992). Old growth of this type historically was maintained by frequent, low-intensity disturbance.

Cool/Moist* and *Cool/Dry Habitat Type Groups- These groups comprise about four percent of the Upper West Branch Watershed and nine percent of the Priest River Subbasin. Sites that are occupied by these habitat type groups generally occur on either low-lying, frosty drainage bottoms or at the upper elevations of the higher mountains. They can consist of a diversity of species with western larch, Douglas-fir, white pine, Englemann spruce, lodgepole pine, alpine fir, and grand fir. The fire-free interval for stand-replacing fires on these sites may be 50-130 years (Smith and Fischer 1987). Periodic fire disturbances and high amounts of low to moderate fire intensities favor species such as lodgepole pine, Douglas-fir, and western larch.

As depicted in table 3-1, the distribution of habitat type groups within the Upper West Branch drainage watershed is fairly similar to that of the greater Priest River Subbasin. Therefore, one could conclude that the historical disturbance agents and the composition of the forests in the Upper West Branch drainage may have been similar to the average historical conditions within the larger Subbasin.

3. Disturbance Processes

Disturbance is a key process for change in vegetation on the landscape. Disturbance can be both natural (e.g. wind storms, wild fire, insect mortality, ice damage) and human caused (e.g. prescribed fire, timber harvest).

Table 3-1. Comparison of habitat type groups between the Upper West Branch watershed and the Priest River Subbasin (National Forest lands only).

Area	Dry	Moist	Cool/Moist	Cold/Dry	Non Forest
Upper West Branch Watershed	3%	90%	3%	1%	3%
Priest River Subbasin	4%	83%	8%	1%	4%

a. Fire

Fire is the major historic disturbance that produces vegetation changes in north Idaho ecosystems. Fire has burned in every ecosystem and virtually every acre of the coniferous forests of northern Idaho and eastern Washington (Spurr and Barnes 1980). Fire was the principle agent for the widespread occurrence and even the existence of western larch, lodgepole pine, western white pine and whitebark pine. Fire maintains ponderosa pine throughout its range at lower elevations and kills ever-invading Douglas-fir and grand fir (Smith and Fischer 1997).

Northern Idaho, northeastern Washington, and western Montana are an island of moisture in the dry interior west. These forests are very productive and produce high levels of organic material. Because these areas generally have more precipitation, wildfire return intervals are longer than in most of the interior west. A recent study describing fire history in the Coeur d'Alene River Basin indicated that an average of once in every 19 years there was a fire season that burned five percent or more of the study area in a single summer (Zack and Morgan 1994). The study showed that historically, in an average summer, fires were patchy with variable intensity. During the periodic drought years, however, there were large stand-replacing crown fires that covered tens of thousands of acres. Lethal stand-replacing fires revisited individual forest stands on an average of once every 200 years - plus or minus 80 yrs (Zack and Morgan 1994).

Based on the Zack and Morgan study (1994), historically over a 70-year period, the total acreage of stand-replacing fires would be approximately equal to one-third the area of the forest. These stand-replacing burns would be a combination of single stand-replacing fires in the range of tens of thousands of acres, and reburns of some of these areas a few years after the initial stand-replacing fire. Mixed-severity fires would have occurred across an area approximately the size of the forest. Although repeated burns would have occurred over some of the same areas.

Fire was also the major natural disturbance event in the Priest River Basin and the Upper West Branch drainage. In 1897 and 1898, a survey was conducted on the Priest River Forest Reserve by John G. Lieberg. Lieberg was a Botanist working for the Department of the Interior-Geological Survey. This report is the earliest documentation of vegetation conditions in the Subbasin. Regarding the role of fire in the area, Lieberg states:

> *"One meets with burnt areas everywhere -- in the old growth, in the second growth, in the young growth, and where the seedlings are beginning to cover the deforested areas have just commenced to obtain a fair hold. The burnt tracts are in large blocks, thousands of acres in extent, and in small patches of 15 to 50 acres which extend in all directions through the forest…The burnt areas are scattered all over the reserve, but the largest amount of damage lies within the zone of the white pine…The most extensive plats of burnt forest are found in the northern and western portions of the reserve*" (Lieberg 1899).

Historical fire maps developed for the Priest Lake Ranger District indicate that approximately 80% (36,517 acres) of the Upper West Branch drainage burned with at least one stand replacing fire since 1880 (see figure H-10 in Appendix H). In addition, approximately 23% (8,398 acres) of the area that burned with these stand replacing fires burned two or more times. The larger fires are noted in table 3-2.

During the last 60 years, fire suppression of the low and mixed severity fires in the Priest River Subbasin and the Upper West Branch drainage has virtually eliminated this natural disturbance process. Rapid suppression of all the fires has removed the opportunity for fires to grow in size and intensity and become stand-replacing type fires. As discussed in various areas of this section, fire suppression is one of the most important factors that led to the change in forest composition, structure, and landscape pattern.

Table 3-2. The date and size of the larger fires that occurred in the Upper West Branch drainage.

Fire Date	Acres burned	Comments
1880	4,953	This entire area reburned in 1889
1889	15,874	
1890	4,116	
1900	718	
1925	669	
1926	7,718	Approximately 40% of this area was previously burned
1939	2,387	Approximately 15% of this area was previously burned
1979	82	
Total	**36,517**	

b. Insects and Diseases

Many insects and diseases are found in the Upper West Branch drainage and most are native and exist at endemic levels. However, there are some native as well as non-native insects and diseases that are likely functioning outside of their historic role.

White Pine Blister Rust: White pine blister rust, an exotic pathogen, was introduced to North America around 1910. Blister rust is a fungal disease that forms cankers on branches or stems of trees that eventually kill or weaken the tree. Weakened trees become susceptible to other disease or to insect attack. Eventually, white pine was infected over the entire Priest River subbasin. Trees were either killed or there was an accelerated harvest to recover their economic value. Loss of mature white pine and the continuing mortality of younger trees due to blister rust have led to the increase in Douglas-fir, grand fir and hemlock now seen across the landscape. Efforts were made to control blister rust through eradication of the alternative hosts, currant and gooseberry. Although these methods had been somewhat successful in the eastern United States, topography and landscape scale in the west prevented success and the program was dropped in 1968 (Neuenschwander et al. 1999, pp. 5, 8, 10, and 12). Applications of antibiotics also proved unsuccessful and emphasis has shifted to development of genetically rust-resistant trees that can be planted throughout the natural range of white pine. There have been successes in genetically improving tree resistance, planting those trees and then using cultural treatments like pruning to improve survival (Schwandt, Marsden, and MacDonald 1994). These programs are continuing today. It is recognized that the best strategy to save white pines from blister rust is to increase the numbers of rust resistant white pines in these ecosystems by aggressively planting them in openings (Samman et al. 2003, p. ii; and Fins et al. 2001, p. 10).

Root Disease: Historically, root diseases were a significant factor in reducing the competition from Douglas-fir and grand fir to maintain western white pine, western larch and on some sites, ponderosa pine. Douglas-fir tended to regenerate readily in the early stages of stand development, but dropped out as a significant component due to high rates of mortality caused by root disease (Byler and Zimmer-Gorve 1990). Western white pine, ponderosa pine and larch have a higher level of resistance at this stage of stand development to root diseases and were able to capitalize on the increased availably of growing space. Fire exclusion and the loss of these species through logging and blister rust has reduced the opportunity for early seral species to become established in areas with root diseases. Although mortality from root disease fungi does not seem as significant in the Upper West Branch as some other locations on the IPNF (such as the Coeur d'Alene Mountains), individual trees as well as disease centers of dead/dying trees were noted in some of the proposed treatment units (see Vegetation section of project file).

Insects: The more significant forest insects of Priest River Subbasin include mountain pine beetle, western pine beetle, Douglas-fir beetle and fir engravers. Historically, mountain pine beetle played a major role in mature white pine forests. Outbreaks were recorded in the early to mid 1900s that killed up to 50% of the mature white pine in some stands and spread over thousands of acres. With the decline of white pine due to blister rust and harvesting, the natural role and significance that this insect plays has changed. More recently, this insect has been found attacking younger, smaller white pine trees that are also infected with blister rust (Neuenschwander et al. 1999, p. 15).

Within some of the stands that are proposed for treatment in the Chips Ahoy project, the mountain pine beetle was observed attacking some of the few scattered, remnant mature white pine that are present (see Vegetation section of project file). In addition to attacking white pine, the mountain pine beetle can often be found attacking and killing lodgepole pine trees. The lodgepole pine become more susceptible to being attacked as they become fairly large in diameter. Some of the stands in the proposed treatment units contain a component of 95-115 year-old lodgepole pine. Some mortality was observed in these trees from this beetle (see Vegetation section of project file).

The western pine beetle is also an important native insect. On some of the drier sites in the Chips Ahoy project area that contain scattered old ponderosa pine or younger pine, this bark beetle was observed killing individual ponderosa pine trees and occasionally small groups of these trees (see Vegetation section of project file). Typically, ponderosa pine mortality from this insect would increase dramatically in dry years and would be more significant in fairly dense stands where the trees are competing heavily for a limited amount of moisture and other resources (see Vegetation section of project file).

Douglas-fir beetle and fir engravers are native insects and have always been present throughout the Priest River Subbasin. The substantial increase in grand fir and Douglas-fir trees across the landscape has led to increased population levels. In addition, the presence of root disease areas has resulted in even higher levels of the Douglas-fir beetle and the propensity for rapid beetle population buildups during favorable conditions. Douglas-fir beetle outbreaks occur following disturbances such as windfall, snow breakage or fire. This was the case in the project area and elsewhere in the Priest River Subbasin in 1996. A series of snowstorms in November of 1996 occurred over the basin and brought wet, heavy snow. This precipitated the Douglas-fir beetle epidemic. Some areas within the Chips Ahoy project area received heavy mortality from the beetle epidemic and some areas were treated under the Douglas-fir Beetle Project FEIS (USDA 1999). However, many areas were not treated when a judicial ruling on a lawsuit stopped the treatments. Many of the proposed treatment areas in the Chips Ahoy project are areas that experienced substantial mortality to the Douglas-fir trees during the epidemic.

In summary, with the impact of the white pine blister rust and the decrease in fire, the role that insects and pathogens play as disturbance agents is growing and changing. With the drastic reduction of the white pine, and the decreased amounts of ponderosa pine and larch, root pathogens have been transformed from thinning agents into major change agents that create openings in Douglas-fir and grand fir stands and accelerates succession towards the shade tolerant species (USDA draft in progress, p. 10). Because we have more Douglas-fir relative to historical conditions, Douglas-fir bark beetles are more significant as disturbance agents than they were historically. They accelerate succession in the short run, and in the long term they create fuel conditions and stand structures that may increase the risk of stand replacing wildfires (USDA draft in progress, p. 10).

c. Weather Disturbances

The weather in the Priest River Subbasin is very unique to the inland area of the western U.S. Strong maritime air flow carries high levels of moisture to this area. Moist maritime air that moves across the Northwest carries significant moisture descending from the Cascade Mountains and across the Columbia Plateau. When this warm/moist air is driven into the Selkirk Mountains, heavy/wet snows can occur and are common in the Priest River subbasin. These storms often result in significant windthrow and breakage in species of trees such as Douglas-fir, western hemlock and grand fir, especially when the ground is not frozen. The narrower crowns of western white pine, the deep rooting habits of ponderosa pine and the deciduous nature of western larch make them less susceptible to this damage. Root diseases make Douglas-fir especially vulnerable to windthrow events. In addition to storms affecting the forests, periods of droughts can have significant effects on tree mortality. The tree species that are more prevalent today than historically are generally those that are the most affected by extended drought.

d. Native American Influences

Prior to any European settlement of the Priest Lake Basin, the Kalispel Tribe of Native Americans had summer camps in the basin and had trail systems from the Pend Oreille Valley over to Priest Lake. Although Native Americans intentionally started fires in parts of northern Idaho and Washington to improve forage for their horses or for hunting purposes, there is no evidence that this occurred in the Priest Lake area. (Sims 2002).

e. Euro-Settlement Influence

Euro-American settlement of northern Idaho and northeastern Washington, which began in the latter part of the 1800s, resulted in many changes to the forest vegetation. In addition to the previously discussed effects of fire suppression and introduction of blister rust, agricultural land clearing and logging have influenced the composition and structure of forest vegetation.

f. Timber Harvest on Federal Land

Logging activity within the Priest River Subbasin and the Upper West Branch drainage began a little over 100 years ago. Most of the early logging was selective cutting to remove larger and more valuable trees. On drier sites, the more valuable ponderosa pine and larch were sometimes removed from areas within the Subbasin. The more shade tolerant Douglas-fir and grand fir were left to dominate. Unless these areas burned during slash reduction operations or by wildfire, ponderosa pine and larch were unable to naturally regenerate. Tree planting was only initiated on areas that were severely devoid of trees due to logging or fires and generally stands with Douglas-fir and grand fir understories were not planted. On moist sites, western white pine and western larch were removed for their value in the early days. With blister rust spreading at a rapid rate, a lot of western white pine was quickly salvaged in order to capture value. Stands of Douglas-fir, grand fir cedar and western hemlock resulted.

A portion of the 1912 Dalkena timber sale extended into the Upper West Branch where the large wildfires of the 1880s and 1900s did not burn. Railroads were built paralleling the stream to access the areas and to haul the logs to the river at Dickensheet, where they were dumped and floated down Priest River to the mills. This sale lasted until 1930. Since that time, portions of the Upper West Branch drainage have been logged except the headwater drainages, which burned in the 1920s and 1939. This area is included in the Hungry Mountain Roadless area and is characterized by seral species. A majority of the logging since the 1960s has consisted of the even-aged harvest methods: clearcut, seed-tree and shelterwood. Most of the units were planted, and the trees range from seedlings to pole-sized timber on the more recently logged areas.

The timber stand management record system (TSMRS) database contains information concerning harvest in the Upper West Branch from about 1960 to the present. While harvesting did take place prior to 1960, records previous to 1960 are not available and thus were not included here. However, existing conditions clearly reflect past harvests. It is important to note that the acre figures in the database represent harvest activity acres, not stand acres. Some of the stands that had harvesting in them had multiple harvests since 1960. In this situation, it is difficult to track in the database if the exact same acres were harvested in the stand because the stands are sometimes larger than the recorded activity acres.

Table 3-3. Past timber harvest in the Upper West Branch Watershed.

Timber Harvest	Approximate Acres	% of All Forest Lands
Regeneration Harvests (includes clearcut, seed tree and shelterwood cuts)	8,360	20%
Overstory Removal (includes liberation cut, shelterwood and seed Tree final removals)	1,790	4%
Sanitation/Salvage	1,768	4%
Thinning (includes commercial thinning, improvement cuts, selection cuts, shelterwood prep and special cuts)	3,410	8%
Totals	15,328	36%

Table 3-3 summarizes the database activity acres of all harvest on Federal Land within the watershed. Since 1960, some form of harvest activities occurred over approximately 15,328 acres or 36% of the national forest lands in the Upper West Branch. A list of all the individual timber sales is located in the Vegetation section of the project file.

g. Homesteading, Grazing and Logging on Private Land

There are approximately 2,000 acres of private land in the Upper West Branch drainage (see figure I-1). Private land is concentrated in the bottomlands of the Upper West Branch, especially in the Big Meadows area. Homesteaders cleared land adjacent to these natural meadows in the early years of the 20th century. Much of this land is still used for agriculture, primarily grazing and hay-raising.

Of the 2,000 acres of private land, approximately 75% is forested. Details on the condition of forest vegetation on private lands within the project area are limited. However, based on reviewing recent aerial photos and from field observations of some of the areas, the following characterization can be made. Some form of logging has occurred on most of the private forestlands. On these lands, regeneration harvests have created some openings in the forest canopy, although existing openings are mostly a result of permanent land clearing for homes and pastures on non-forested parcels. In general, timber harvests on private lands often tends to selectively remove trees of highest economic value (usually the largest), and natural regeneration is relied on to fill in any created openings. This practice tends to result in more regeneration of shade-tolerant Douglas-fir, hemlock, cedar, and grand fir over the early seral species such as pine and larch. Also, with the tendency to harvest the larger, older trees, there is generally not much large/mature or old growth structure on private lands. Observations within the Upper West Branch seem to be very consistent with the patterns discussed above. Shade-tolerant species seem to dominate the private forests and in general, the trees are fairly small and young. Most of the private forests are in the immature/medium timber or pole/small timber structural stages.

3.23c Current and Historical Conditions within the Priest River Subbasin and the Upper West Branch Analysis Area

1. Forest Composition

Forest cover types describe the tree species that dominate a particular site. These cover types were used to describe the existing and historical forest composition (from the TSMRS database) within the Priest River Subbasin and Upper West Branch drainage. Existing cover types were developed from the TSMRS database and the historical information was derived from the Priest River GA (USDA draft in progress).

Table 3-4 and figure 3-1 present the existing and historical forest composition for the Upper West Branch watershed and for the larger Priest River Subbasin. This information illustrates the dramatic shift that has occurred over time. Within the Priest River Subbasin, larch and white pine together historically comprised 59% of the cover types and now these species comprise only 8%. Ponderosa pine historically comprised 4% of the cover types in the Subbasin and now it only occupies 2%. Conversely, grand fir/hemlock, as well as Douglas-fir and cedar increased dramatically. These four species historically dominated 23% of the cover types as compared to 73% today.

Reliable historical information is not available for the forest composition within the smaller Upper West Branch watershed. However, because the distribution of habitat types within the Upper West Branch drainage is fairly similar to that of the larger Priest River Subbasin, it is reasonable to assume that the historical composition in the Upper West Branch was fairly similar to the distribution within the larger Subbasin.

The existing composition of forests within the Upper West Branch is very similar to the current situation for the larger Priest River Subbasin. Currently in the Upper West Branch drainage, grand fir/hemlock, Douglas-fir and cedar comprise the majority of the composition, while larch, white pine and ponderosa pine occupy very little.

The primary cause of these changes was the introduction of the blister rust disease, fire suppression, and past timber harvest practices. Blister rust was the most important factor in the reduction of white pine (USDA in progress, pp. 22-23). The past logging practices of selectively removing the ponderosa pine and larch, along with fire suppression are the main reasons that those species have declined. Fire suppression and logging systems that do not create significant openings, are the current causes for the increase in the shade tolerant hemlock, grand fir and Douglas-fir.

Table 3-4. Acres and percent of forest cover types in the Upper West Branch Watershed as compared to current and historic levels across the Priest River Subbasin*.

Conifer Species Forest Cover Type	Current Acres Upper West Branch Watershed	Current Percent of Upper West Branch Watershed	Current Percent of Priest River Subbasin*	Historic Percent of Priest River Subbasin	Percent Change From Historic To Current For Priest River Subbasin
Douglas-fir	8,686	19%	20%	9%	+121%
Grand fir/W.Hemlock	13,198	29%	26%	6%	+332%
W. Larch	2,295	5%	4%	22%	-83%
Cedar	11,882	26%	27%	8%	+220%
Ponderosa Pine	500	1%	2%	4%	-56%
Lodgepole Pine	2,157	5%	5%	6%	-14%
White Pine	1,860	5%	4%	37%	-89%
Subalpine Fir/Spruce	2,583	4%	12%	8%	+47%
Unknown	478	1%			
Non Forested	1,801	4%	No data	No data	
Total	45,440	100%	100%	100%	

*Figures for the Upper West Branch drainage include private lands. Figures for the Priest River Subbasin represent only National Forest lands. Numbers are rounded to nearest acre or percent.

The changes in forest composition that are presented here are consistent with the trends that were noted within the larger ecosystem assessments conducted for the Upper Columbia River Basin and for the Northern Region. While the IPNF Forest Plan does not mandate that we manage the forests to achieve the historical compositions (or structures), it is generally recognized in the more recent GA and broader scale assessments that significant departures could lead to less resilient, healthy and productive forests.

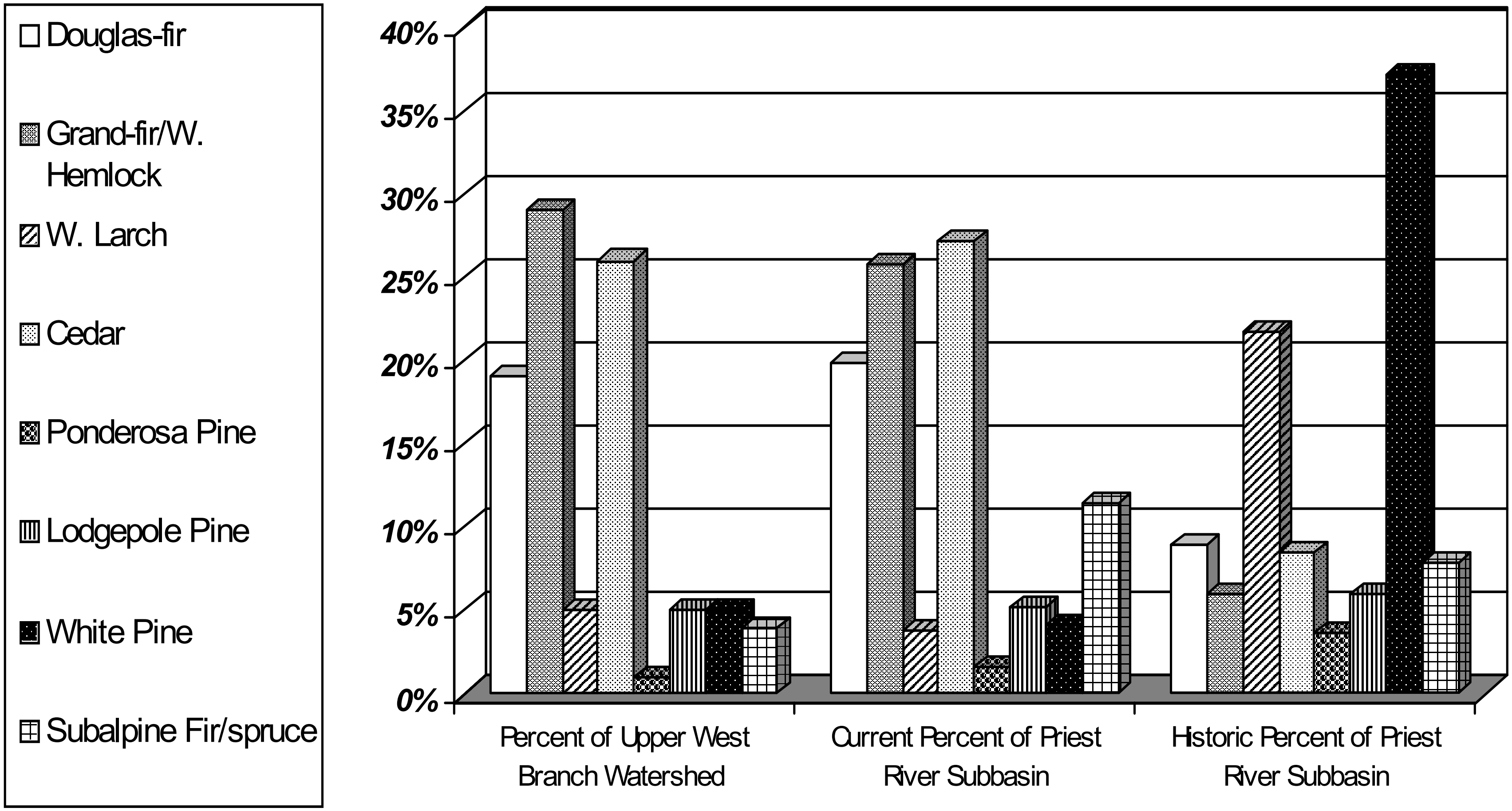

Figure 3-1. Percent of forest cover types in Upper West Branch Watershed as compared to current and historic cover types in the Priest River Subbasin.

Some silvicultural strategies to restore white pine to the moist sites include creating openings through regenerating stands and planting resistant seedlings, using prescribed fires to prepare seed beds and reduce competition, and pruning and thinning young white pine to remove rust infections to extend the life of the trees (Samman et al. 2003, pp. 6-8; Fins et al. 2001, pp. 16-18; Neuenschwander et al. 1999, p. 18).

Western larch is the most shade-intolerant conifer in the inland northwest and therefore it requires openings to regenerate and grow well (Burns et al. 1990, p. 168). It also favors seedbeds that have been burned (Schmidt et al. 1976). Although it outgrows other species when young, by the time it reaches 60 to 90 years old growth slows down and shade-tolerant species can begin to out compete the larch.

Historically, mixed and low severity fires played a key role in maintaining larch stands by selectively killing the more shade-tolerant, less fire resistant species (USDA draft in progress, p. 23). In the absence of fire or another disturbance such as thinning that can favor the larch, the larch will begin to die out of the stands in the few decades after age 90. Therefore, in order to increase the amount of larch on the landscape it is necessary to create openings (preferably in association with prescribed burning) and regenerate the species. Where young stands already contain larch that have adequate crowns, it is necessary to keep the stands somewhat open through thinning in order to prevent the shade tolerant species from out-competing the larch (Schmidt et al. 1976).

2. Forest Structure

Forest structure can be described by the size, age, and arrangement of trees in a stand. For this analysis, five structural stage categories were used to measure and characterize the forests (see box entitled Forest Structural Stages).

The distribution of structural stages within the Upper West Branch watershed as well as Priest River Subbasin is shown below in table 3-5. Existing structural stages were determined from the TSMRS database and the historical information was developed as part of the GA (USDA draft in progress). This table also contains an estimate of the historic range of variability for the structural stages across the

Forest Structural Stages

Shrub/seedling/sapling Stage – This is the youngest and smallest stage and generally includes forests where the tree diameters are less than 5”. These stands tend to be less than 35 years old and most have resulted from past regeneration harvests or natural events such as fire. These stands may consist of seedlings less than one year or trees planted in clearcuts in the late 1960s or 1970s that are now 30-40 feet tall. Some stands may retain a considerable number of large overstory trees while others may have no large tree component.

Pole/Small Timber Stage – This stage usually occurs from approximately 35 to 50 years old and is dominated by trees with diameters of approximately 5-9 inches and the stands are generally dense. These stands may have developed from fires or from harvesting in the 1950s and 1960s.

Immature/Medium Timber Stage – This stage occurs from about 50 to 100 years after a disturbance and is generally dominated by trees in the 9 to 15 inch diameter range. Stands in this category tend to be fairly dense and have either developed from early logging in the 1940s and early 1950s, or are a result of wildfires in the 1920s and 1930s.

Mature/Large Timber Stage – This stage occurs when stands are more than 100 years old and are dominated by trees over 9 inches in diameter. Stands in this mature/large timber stage generally resulted from the wildfires in the late 1800s and early 1900s. Conditions within this stage can be quite variable. Some can be fairly open as a result of insect mortality, root diseases, past harvest activities or fires, or harsh soil conditions. Stands unaffected by these disturbances will be dense and have fairly closed canopies.

Old Growth Stage– This stage occurs when trees reach diameters greater than 21” and are older than 150 years. These are stands that resulted from fires or other natural disturbances prior to about 1850. These stands often contain different age classes of trees from multiple disturbances.

northern three Districts of the IPNF.

Shrub/Seedling/Sapling Structural Stage - Within the Upper West Branch, this structural stage comprises approximately 23% of the forests and is close to the average amount that historically occurred across the Priest River Subbasin. Currently, the percentages of this structural stage within the Upper West Branch as well as the Priest River Subbasin falls within the historic range of variability for the northern zone of the IPNF. However, at both the Priest River Subbasin and the Upper West Branch scales, much of this structural stage is actually composed of older sapling size trees that are beginning to make the transition to the pole/small tree structural stage. The current level of timber harvesting is not sufficient to maintain the historic levels of shrub/seedling/sapling stands. As the older sapling stands mature to the pole structural stage within the next two decades, the amount of shrub/seedling/sapling stands will likely decline to below historical levels (USDA draft in progress, p. 38).

Table 3-5. Acres and percent of forest vegetation in each structural stage.

Structural Stage	Upper West Branch Watershed	Percent of Upper West Branch Watershed	Current Percent of Priest River Subbasin	Historic Percent of Priest River Subbasin	Historic Range of Variability Across the Northern IPNF
Shrub/Seedling/Sapling	9,964	22.8%	18.2%	20.9%	15-50%
Pole/Small	3,598	8.2%	10.7%	12.0%	15-50%
Immature/Medium	12,634	28.9%	24.5%	19.9%	
Mature/Large	9,922	22.7%	31.0%	22.9%	15-35%
Old Growth	7,584	17.4%	15.5%	24.3%	15-35%
Totals	43,702*	100%	99.90%	100.00%	

*Excludes non-forested areas (1,738 ac.). Includes both National Forest lands and private.

Pole/Small Timber Structural Stage – Approximately 8% of the forests in the Upper West Branch are occupied by this structure. Although this amount is somewhat less than both the current (10.7%) and historical structure (12.0%) of the Priest River Subbasin, many older sapling stands are transitioning to this pole/small timber structural stage and therefore this structural stage will become more prevalent in the near future.

Immature/Medium Timber Structural Stage- Currently about 29% of the Upper West Branch, and 25% of the Priest River Subbasin is occupied by this structural stage. As compared to the historical amount in the Priest River Subbasin (about 20%), there is currently more of this stage. Many of these stands, both in the Upper West Branch and the Priest River Subbasin, originated after the wildfires in the 1920s and 1930s and will remain in this stage for many years. Over the next few decades, this structural stage will likely remain above historic levels and actually increase over the Priest River Subbasin (USDA draft in progress, p. 28). Compared to historical conditions, the existing stands in this structural stage tend to be denser with more canopy layers.

Mature/Large Timber Structural Stage- This structural stage currently occupies approximately 23% of the forests within the Upper West Branch and 31% over the Priest River Subbasin. Historically, the Priest River Subbasin contained an average of approximately 23%.

Old Growth Structural Stage- Within the entire Upper West Branch drainage, approximately 17% of the forests occur within this structural stage. Approximately 16% currently occurs across the larger Subbasin where 24% occurred historically. Within the Subbasin, historically there were significant amounts of old growth (and mature/large) white pine and larch on moist sites, and ponderosa pine on dry sites. However, very little of these types of old growth remain. They have been replaced by hemlock, Douglas-fir, grand fir and cedar stands growing on upland sites (USDA draft in progress, p. 28). For the Douglas-fir, hemlock and grand fir, there are serious doubts about the long term stability or sustainability of these forest types as old growth (USDA draft in progress, p. 28). A more thorough discussion of the old growth stands is presented later in this section.

a. Allocated Old Growth

Table 3-5 presents the total number of acres of old growth within the Upper West Branch that meet the definition of old growth as adopted by the IPNF. Old growth stands are defined in the Regional Task Force Report "Old Growth Forest Types of the Northern Region" (Green et al. 1992). Old growth stands were allocated for retention based on direction from the Forest Plan (page II-20), the Regional Task Force Report mentioned above, and Forest Supervisor letters of direction for implementing the Forest Plan old growth standards (see Vegetation section of project file). For this project, the stands that had been previously identified as old growth as well as potential old growth stands were reviewed. This review process is found in the Vegetation section of the project file. All or portions of six old growth management units (OGMUs) occur in the Chips Ahoy project area (see figure H-9 in Appendix H). These OGMUs are approximately 8,000 to 17,000 acres in size. The number of acres and percent of old growth stands within these units is listed below in table 3-6.

No alternatives propose harvesting within old growth stands. Information on how the alternatives are consistent with Forest Plan standards regarding old growth is presented in Appendix C.

Table 3-6. Allocated acres of old growth on National Forest lands within each OGMU.

OGMU (Unit #)	Total Acres of OGMU	Allocated Old growth	
		Acres	% of OGMU
11	15,652	1,797	11.5
12	14,578	2,906	19.9
16	17,014	315	1.9
17	11,673	1,255	10.8
18	14,682	982	6.7
28	8,680	3,890	44.8

3. Landscape Pattern

In order to understand how forest ecosystems function and how management activities could affect them, it is important to consider the pattern of forests on the landscape and how they are arranged. The pattern of forests on the landscape can affect wildlife and plant habitats and dispersal, disturbance (fire, insects, pathogens) spread and size, and human values such as aesthetics (USDA draft in progress, p. 43).

As part of the GA for the northern zone of the IPNF, a landscape pattern analysis was conducted to determine how the pattern of forest structure has changed from 1935 to 1994. A portion of the Priest River Subbasin was selected as one of the analysis areas for this study. The area within the Priest River Subbasin that was selected for analysis is similar to the Upper West Branch drainage in that both areas contain portions of the landscapes that are heavily roaded and have had fairly intensive forest management, as well as areas that are lightly roaded or unroaded (USDA draft in progress, p. 43). The FRAGSTATS program (McGarigal and Marks 1995) was used to determine different aspects of landscape pattern using the forest structural stages.

The FRAGSTATS program generates indices that can be used to characterize landscape pattern. Two of these indices are presented below in table 3-7. The GA (USDA draft in progress, pp. 48-49) contains a more thorough list. The results of the analysis conducted for the GA focused on three categories of structural stages: the early-successional "seedsap/no tree" structural stage, the mid-successional “medium” tree structural stage, and the late-successional “large” tree structural stage.

Table 3-7. Landscape Pattern Indices for a portion of the Priest River Subbasin

Structural Stage	FRAGSTATS Index	Priest 1935	Priest 1995	% Change
Seedsap/No Tree	% of landscape	34.6%	26.5%	-23%
	Mean patch size (acre)	97.6	79.1	-19%
Medium	% of landscape	43.1%	52.2%	21%
	Mean patch size (acre)	339.5	566.4	67%
Large	% of landscape	12.7%	9.0%	-29%
	Mean patch size (acre)	313.6	145.3	-54%

Compared to historical conditions, both the early successional structures (seedsap/no tree stage) and the late successional structures (mostly old growth) have changed in similar ways. The area that these structural stages cover in the analysis area declined from historic levels: 23 % for the seedsap/no.tree stage and 29% for the large tree stage. In addition, the average patch size declined substantially because smaller patches were created and dispersed across the landscape. This has increased the fragmentation of these structural stages.

Changes to the mid-successional medium tree structural stage were in the opposite direction. This structure now occurs over a larger percent of the landscape than historically and average patch sizes have increased.

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

Table 3-8 provides information on the existing landscape pattern for the Upper West Branch drainage. The FRAGSTATS model was used to quantitatively describe the existing pattern. The same two indices are displayed in this table. Pre-European settlement patch sizes were not quantitatively determined for the Upper West Branch drainage. However, by reviewing the fire history and the existing structure maps of the drainage (see Vegetation section of project file) it is apparent that similar trends to those described above for the Subbasin have occurred in the Upper West Branch as well. Compared to the early 1900s, patch sizes for the young and old structural stages were much larger in the Upper West Branch.

Table 3-8. Existing average patch sizes within each structural stage for the Upper West Branch drainage (includes private land).

Structural Stage	% of Area	Mean patch Size (acre)
Seed/Sap	21.9	53.6
Pole/Small	7.9	47.4
Immature/Medium	27.8	93.7
Mature/Large	21.8	84.8
Old Growth	16.7	154.7

3.23d Conclusions, Desired Future Conditions and Recommendations

After considering forest conditions of the Upper West Branch watershed and the historical and current conditions at the larger Priest River Subbasin scale, the following conclusions can be made. Desired future condition statements and management recommendations are provided.

1. Forest Composition

Conclusions: The species composition of the forests within the Upper West Branch drainage and the larger Priest River Subbasin has changed dramatically since European settlement. There has been a substantial reduction in the percent of the landscaped dominated by long-lived western white pine, western larch and ponderosa pine. In contrast, Douglas-fir, grand fir, hemlock and cedar has dramatically increased. The tree species that are more common today tend to be shorter lived, more susceptible to insects and diseases, and less resistant to fire and drought. This has created a situation that could jeopardize the long-term health, function and resilience of the forest ecosystem.

Desired Future Condition: The desire is to trend the forests within the Upper West Branch towards the historic composition where long-lived, seral white pine, larch and ponderosa pine dominate the landscape.

2. Forest Structure

Conclusions: As compared to historical conditions, the distribution of structural stages within the Priest River Subbasin has changed substantially. The amount of Shrub/Seedling/Sapling structural stage is below historic levels for the Priest Subbasin. Without some large wildfire event or other major disturbance, this structure will likely fall below the historic range within a couple of decades. The amount of old growth structure in the Subbasin is currently below historic levels and is near the lower range of historic variability for the northern portion of the IPNF. In addition, the composition of old growth has shifted from stands dominated by larch, white pine and/or ponderosa pine, to stands dominated by hemlock, grand fir and cedar. In contrast, the amount of the landscape within the Subbasin that is within the immature/medium and mature/large timber structures is above historic levels. At the Upper West Branch watershed scale, these same trends are occurring.

Desired Future Condition: The desire is to trend the forests within the Upper West Branch more towards the historic distribution of structural stages that would have occurred within the Subbasin. The goal is to increase the amount of the watershed within the shrub/seedling/sapling structure stage and eventually increase the amount of mature/large and old growth stands that are dominated by long-lived seral ponderosa pine, western larch and white pine.

3. Landscape Pattern

Conclusions: Compared to the early 1900s, the forests within Priest River Subbasin and the Upper West Branch have become more fragmented. The average patch sizes for the shrub/seedling/sapling and the old growth structural stages have decreased in the Subbasin and the Upper West Branch. In contrast, patches of immature/medium and mature/large structural stages have increased in size within the Priest River Subbasin.

Desired Future Condition: The desired condition is to reverse the trend of fragmentation and create larger patch sizes of the shrub/seedling/sapling structural stage while decreasing the immature/medium patch sizes. In addition, the long-term desire for old growth is to increase its patch size but do so with stands that are dominated by the long-lived seral ponderosa pine, western larch, and white pine.

4. Recommendations

As mentioned earlier in this discussion, the Upper West Branch drainage occurs within a larger area that was identified within the GA as being part of a low integrity/high risk landscape. Management strategies to help reverse these conditions were previously summarized. The following recommendations for the Upper West Branch are consistent with those strategies and would help trend the forest vegetation towards the desired conditions. These recommendations, as well as Forest Plan direction and the other resource issues discussed in Chapter I, were used in developing the proposed vegetation treatments for the Chips Ahoy Project.

- Increase the amount of long-lived early seral tree species as well as the amount of the Upper West Branch occupied by the shrub/seedling/sapling structure stage. Create openings using regeneration harvests and planting. Try and concentrate these activities where existing stands are dominated by the non-desirable species and where past mortality has already affected the stands. Where possible, use prescribe burning to create the desirable site-preparation conditions that give the favored tree species a competitive advantage.
- Increase the average patch size of the shrub/seedling/sapling structure stage by creating rather large openings and/or placing the openings near existing stands that have a similar structure. Attempt to place these openings within stands that are either in the immature/medium timber structural stage and dominated by less desirable species, or are

within the mature/large timber structural stage and are not of the composition that would likely develop into desirable mature/large timber and old growth structural stages.

- In stands where they are already present in significant amounts, maintain the long-lived shade-intolerant larch, rust resistant white pine and ponderosa pine species by favoring these species and removing the less desirable, shade-tolerant species. Depending upon the circumstances, treatments such as the following can be used: commercial thinning, improvement cuts, shelterwood removals, white pine pruning, pre-commercial thinning and where possible, underburning.

3.24 Environmental Consequences

3.24a Methodology

Most of this section focuses on discussing how the proposed activities would affect the composition, structure, and pattern of the forest vegetation. These elements were deemed the most important for analysis as they directly relate to the purpose and need for proposing the project. The effects are presented as to how they would help trend the vegetation towards the desired conditions. In addition, this section will present other issues that involve consistency with Forest Plan and/or Regional objectives and standards. Laws such as the National Forest Management Act will be discussed as it relates to the treatment of forest vegetation. Some of the other discussion items include forestland suitability, old growth standards, appropriateness of even-aged silvicultural systems, forest canopy opening sizes, and reforestation and forest protection standards.

The direct and indirect effects that the alternatives would have upon the forest vegetation are presented at the treatment unit scale. For the cumulative effects discussion, the past, ongoing, proposed and foreseeable future activities are presented as to how they would cumulatively affect the forest vegetation within the larger Upper West Branch drainage. Lastly, there is discussion on how the alternatives are, or are not, consistent with Forest Plan direction and other applicable laws.

Two of the action alternatives (B and C) would create forest openings larger than 40 acres. The National Forest Management Act (NFMA) requires that all openings created by regeneration type cuts shall be 40 acres or less in size unless they meet certain criteria for exception, or Regional Forester approval is granted. This issue is discussed under the Cumulative Effects heading.

For details on how each individual proposed unit would be treated under the action alternatives, refer to tables C1 to C-3 in Appendix C. Those tables indicate what silvicultural prescription would be implemented for each harvest unit (and ecoburn units) as well as items such as what logging system and fuel treatments would be used. In addition, the Vegetation section of the project file contains a summary of the existing stand conditions for each of those proposed units by treatment type, as well as a brief discussion of the objectives and outcomes of the proposed treatments.

The analysis that is discussed below assumes that wildfires will continue to be actively suppressed within the Upper West Branch watershed. The suppression of all wildfires in this area is a requirement of the current Forest Plan. Since the 1940s, suppression efforts have been successful in preventing large wildfires from occurring within the drainage but there are no guarantees that this will continue. To the contrary, the Upper West Branch watershed lies within an area of the Priest River Subbasin where fire risks are growing (USDA draft in progress, p. 27).

3.24b Direct and Indirect Effects at the Treatment Unit Scale

The following discussion focuses on the direct and indirect effects that the various alternatives would have upon the forest vegetation at the treatment unit scale. For this analysis, direct effects are considered as those that would influence the forest composition and structure in the short-term (for approximately 10 years) while indirect effects are those that would occur over the long-term (longer than 10 years).

1. Alternative A - No Action

Under this alternative, there would be no activities to treat the forest vegetation at this time. The activities described in the proposed action and other action alternatives would not occur. In the absence of major disturbances such as wildfires, insect/disease outbreaks or substantial storms, the existing composition and structure of the stands that are proposed for treatment under the action alternatives would not change substantially in the near future. A summary of the existing structure and composition for those stands that are proposed for treatment is provided in table 3-9. The composition and structure that is indicated in that table under the heading of "Existing Condition" represents both the existing condition as well as the condition that would result in the short term under the No-Action alternative.

Table 3-9. The existing distribution of structural stages and forest types (acres) of those stands proposed for treatment and the resulting changes that would result from the action alternatives.

	Existing Condition	Alternatives B and C Change in Acres	Alternative D Change in Acres
Structural Stage			
Shrub/Seed/Sap	318	+787	+16
Pole/Small	0	0	0
Immature/Med.	649	-283	-110
Mature/Large	711	-504	+94
Old Growth	0	0	0
Forest Type			
Douglas-fir	1059	-822	-125
Cedar	195	-108	-74
Grand fir	14	+69	+67
Hemlock	171	-150	-37
Subalpine fir	37	-37	-37
Lodgepole pine	40	-40	-30
Western Larch	134	+552	+55
Ponderosa pine	28	+196	+107
White Pine	0	+340	+74

Over a longer-term (10 plus years), the No-Action alternative would have substantial effects on the composition and structure of the stands. Even though active management would not occur under this alternative, the forest stands would still change. Even in the absence of a major disturbance such as a large wildfire or insect/disease outbreak, the process of forest succession and the presence of endemic levels of insects and diseases would affect the stands.

Approximately 86% of the stands that are proposed for treatment are currently dominated by species such as Douglas-fir, hemlock, cedar and grand fir. Many of these stands have immature/medium or mature/large structures and contain relatively small amounts of larch, ponderosa pine and blister rust infected white pine. In contrast to the larch, ponderosa pine and white pine trees that historically dominated most of these sites, the other species tend to be relatively short-lived, highly susceptible to insects/disease agents, more prone to drought stress or storm damage, and fire intolerant. When combined, those characteristics create stands that are relatively unstable and prone to more kinds, or more extensive disturbances. In the absence of a wildfire, it is expected that these stands would continue the trend of becoming even more heavily dominated by the less desirable, shade tolerant species and move even further from the desired conditions. The relatively small amount of larch, ponderosa pine, and non-resistant white pine that occur within these stands would continue to decline in the future. Blister rust would continue to decrease the white pine component in these stands and the shade intolerant larch and ponderosa pine would be replaced by the more shade-tolerant species.

Of the stands proposed for treatment, currently there are a few (about 10%) that are dominated by long-lived, desirable species such as larch or ponderosa pine. However, these stands also contain lesser amounts of shade tolerant species such as Douglas-fir and grand fir on the drier sites, and hemlock, grand fir and cedar on the moist sites. In the absence of disturbances such as the low and moderate intensity wildfires that historically favored the larch and ponderosa pine, the more shade tolerant species that are present within these stands would dominate, as the others are shaded out. This would lead to further decreases in the amount of mature/large and old growth stands that are dominated by long-lived seral ponderosa pine, western larch and white pine.

The distribution of structural stages would also trend away from the desirable condition. In the absence of a large wildfire or other major disturbance, the shrub/seed/sapling structure stage would come to represent an even smaller percentage of the landscape while the pole/small and immature/medium structural stages would continue to increase in their representation. Some of the mature/large stands might move into the old growth structural stage in the future but they would be largely be composed of species that are very susceptible to disturbance events like fires, insect/disease outbreaks and droughts. Therefore, these stands would be relatively unstable.

One of the proposed treatment units (Unit #52) contains ponderosa pine trees that were planted about 60 years ago from “offsite” planting stock. Because the seed for these planted seedlings did not come from around this area, there is a concern that these trees could be genetically contaminating the local population of ponderosa pine trees. The No Action alternative would not remove these offsite trees and reduce this contamination threat. Although all of the ecological ramifications of this potential contamination are not known, Forest Geneticists have recommend that the offsite trees be removed (see Vegetation section of project file).

2. Alternatives B and C

With one exception, both Alternatives B and C would treat the same areas and would utilize the same silvicultural prescriptions to manipulate the vegetation. The exception is that Alternative B would treat one additional unit (Unit #52- 80 acres) that would not be treated under Alternative C. Alternative B would treat approximately 1,678 acres while Alternative C would treat 1,598 acres. The alternatives are so similar in how they would affect the forest vegetation that for most of the discussion, the effects are considered to be the same. The primary difference between the two alternatives is the absence of new road construction under Alternative C and the types of logging systems that would be used to accomplish the vegetation treatments.

Both Alternatives would affect the composition and structure in the same way. Table 3-9 illustrates how the structural stages and forest types would change by implementing either of these alternatives. The amount of shrub/seed/sapling structural stage would increase by 787 acres while the amount of immature/medium and mature/large structural stages would decrease by 283, and 504 acres respectively. Most of this change in structural stages occurs as a result of the proposed regeneration harvesting. Some of the stands in the immature/medium and mature/large structural stages that are dominated by less desirable species would be regenerated through harvesting, prescribed burning and the planting of larch, white pine, and ponderosa pine.

Both Alternatives would affect the forest composition in similar ways. The alternatives would increase the acres that are dominated by the desirable larch, white pine, and ponderosa pine by 1,088 acres, and would reduce the undesirable species by the same amount. Most of this shift in composition would occur as a result of regenerating stands that are currently dominated by less desirable species and shifting them to desirable compositions through planting the rust resistant white pine, larch and ponderosa pine. To a lesser degree, the shift in composition also occurs when a stand contains a mix of species and a thinning type treatment selectively favors one species over another and changes the dominant species in the stand. For example, some of the units that are proposed for treatment are currently dominated by Douglas-fir, but they also contain a substantial amount of ponderosa pine. The forest type can be shifted to ponderosa pine by removing more of the Douglas-fir and encouraging the future growth of the ponderosa pine.

There is one effect that Alternative B would have upon the forest vegetation that Alternative C would not. Alternative B would include removing the “offsite” ponderosa pine trees that were planted in proposed Unit #52 while Alternative C would not include this activity. Therefore, as compared to Alternative C, Alternative B would have the added benefit of reducing the risk of genetically contaminating the local ponderosa pine population. With this one exception, both Alternatives B and C would trend the forest vegetation towards the desired condition to a similar degree and would achieve the vegetative purpose and need at the same level.

3. Alternative D

This alternative was designed to address the public issue that was identified regarding the use of even-aged silvicultural systems and the creation of new openings in the forest. Therefore, this alternative does not include any of the units that would treat the stands using either the seed tree or irregular shelterwood systems. This alternative would treat a total of approximately 834 acres.

This alternative would increase the acres that are dominated by the desirable larch, white pine and ponderosa pine by 236 acres and would reduce the acres dominated by the more undesirable species by the same amount (table 3-9). Because the treatments that are included in this alternative do not include regeneration type treatments, all of the change in the species composition would occur when the desirable species are favored by removing the other species in the stand to a greater degree. Although this shift in species composition is in the correct direction (towards the desired condition), the improvement would be relatively small in comparison to the other action alternatives and to the needs within the project area.

With this alternative, the amount of acres in the shrub/seedling/sapling structural stage would increase slightly (16 acres) while the amount in the immature/medium structural stage would decrease by 110 acres. The mature/large stage would be increased by 94 acres. The increase in the shrub/seedling/sapling structure and decrease in the immature/medium stage is an improvement by trending towards the desired condition. However, compared to the other action alternatives the magnitude of improvement is relatively small.

4. Direct and Indirect Effects of Other Proposed Activities

In addition to the vegetative treatment activities that have been discussed above, the action alternatives include other activities that could potentially affect the forest vegetation. Road decommissioning activities associated with the action alternatives would have the effect of allowing some of the existing roads to slowly become forested again. Grasses, shrubs, and forbs would initially revegetate these sites and conifers would be expected to eventually dominate the sites. All of the action alternatives would decommission approximately 28 miles of road and this would equate to approximately 140 acres. The long-term effects to the forest vegetation would be a slight increase in the acres of forested vegetation. However, Alternatives B and D both include some temporary as well as permanent road construction. The temporary road construction would involve removing the trees in the roadway, using the road and then obliterating the road. The effect would be that the forests would be removed for approximately 5 years and afterwards, these areas would slowly become re-vegetated and eventually become dominated by conifers. Alternative B would involve constructing approximately 2.5 miles (12.5 acres) of temporary road while Alternative D would involve constructing approximately .3 miles (1.5 acres) of temporary road. The effect of the permanent road (the road 1108 bypass) construction would be to remove that area out of forested conditions (approximately .7 miles or 3.5 acres) and this would apply to both Alternatives B and D. The proposed location for this new permanent road construction was reviewed and it was determined that the road would not occur within any stands meeting old growth criteria (see Vegetation section of project file).

3.24c Cumulative Effects at the Watershed Scale

The area of the Upper West Branch watershed was selected as the cumulative effects analysis area for forest vegetation (see Affected Environment, methodology section for an explanation).

1. Effects of Past, Ongoing, and Reasonably Foreseeable Activities for all Alternatives

Past activities (such as timber harvesting, fire suppression) and natural processes that have affected the forest vegetation have been considered and are described as part of the existing conditions in the Affected Environment section. The ongoing and reasonably foreseeable future activities within the cumulative effects analysis area that are relevant to the forest vegetation analysis are discussed below.

1) *Firewood Gathering for Personal Use on National Forest lands*- This ongoing activity occurs primarily within approximately 200 feet of roads. Although this activity reduces standing snag numbers and the number of down trees near roads, it is not significant enough to change the forest type or structural stage within timber stands. Therefore, the activity would not cumulatively add to the effects of the alternatives.

2) *Treatment of Noxious Weeds on National Forest lands* - Relative to the forest composition, structure, and landscape pattern, the noxious weed treatments would not have any effects. See the noxious weed section for more details.

3) *Fire Suppression on all lands* - As previously described under the methodology section for environmental consequences, it was assumed that active fire suppression would continue in the analysis area into the future. Therefore, the effects of this activity were taken into consideration during the discussions for the alternatives.

4) *Pre-Commercial Thinning and White Pine Pruning on National Forest lands* – Pre-commercial thinning would affect the forest composition and structure of those stands in the long-term. During thinning operations, the more desirable larch, ponderosa pine and white pine trees would be favored to leave as opposed to the shade tolerant, less desirable species. Without this activity, desirable shade-intolerant species would eventually be shaded out of the stands. Therefore, the long-term effects of this activity would be beneficial towards meeting the desired vegetation conditions, adding to the benefits derived from any of the action alternatives. In addition, the thinning would result in increased tree growth and vigor of the residual trees. This would generally increase the ability of the desired species to resist insect/disease agents. Stands that otherwise would develop into dense, slow growing, small diameter stands would instead become larger structures in a quicker time frame.

   The effects of white pine pruning would be beneficial by increasing the number of white pine that would likely survive and develop into large trees. This would help trend the composition towards the desired conditions.

5) *Timber harvesting, Residential Development and Grazing on Private Lands* - As described in the Affected Environment section, approximately 2,000 acres of private land occurs in the analysis area and about 75% of this is forested. Harvesting, residential development, grazing and associated activities are the main activities that have occurred on the private lands within the analysis area and affected the forest vegetation. It is anticipated that a similar pattern will occur into the future. Harvesting will continue to occur on the private timberland. The larger and more valuable trees will probably be selectively removed and the smaller, less valuable species will be left. The stands will probably be dominated by fairly young, small trees and most will be the shade-tolerant species such as grand fir, hemlock, cedar, Douglas-fir and subalpine fir. Currently there are three unexpired forest practice permits for timber harvesting on private land in the analysis area. In Washington, a timber company is harvesting trees in the following legal location: T34N, R45E, S1/2 Section 27. This harvesting is on 63 acres and will be some form of uneven-aged management. In Idaho, harvesting has been authorized for 50 acres under two permits in the following locations: T59N, R5W, Section 14,15, 20, 21, 22, 29, 30.

   A relatively small amount of residential development has been occurring in the Big Meadow area recent years and this may occur to a small degree in the future. A small amount of forest clearing has occurred as a result. Grazing will probably occur on the private lands in the future, with most of this concentrated in the meadowland.

6) *Grazing on National Forest Lands* - Should the existing inactive grazing allotments become active most of the grazing would occur along roadsides or near the small grassy meadows that occur in the analysis area. To a much lesser degree, the cattle would graze within recent timber plantations where grasses, forbs and young shrubs were present.

Regarding the effects to the forest vegetation, cattle would occasionally eat seedlings or trample trees in these plantations. However, based on visual observations, past effects were small and very localized. Therefore, should these allotments become active again, the effects are not anticipated to be substantial enough to influence the composition, structure and pattern of the forests.

7) *Slash disposal and reforestation activities on Forest Service timber sales* - These activities will help establish desirable tree species in these areas and trend the forest composition towards the desired condition.

8) *Road Decommissioning on National Forest lands* - As previously described, road decommissioning would affect the forest by allowing the road to slowly become forested again. This 21 miles would equate to approximately 105 acres.

2. Alternative A (No Action)

The existing composition and structure of the forests within the Upper West Branch watershed is depicted in table 3-10. As described previously under "Direct and Indirect Effects at the Treatment Unit Scale," this alternative would not result in any changes to the composition or structure in the short-term. However, in the long-term, less desirable species such as Douglas-fir, grand fir, hemlock and cedar would continue to become more and more dominant, while the relatively long-lived, insect/disease resistant, fire and drought tolerant species such as ponderosa pine, larch and white pine would continue to decline.

Table 3-10. Existing composition and structure of timber stands in the Upper West Branch Watershed and the change that would result with the alternatives. Figures include both National Forest and private lands.

	Existing Condition & Alternative A	Alternative B and C		Alternative D	
	Approx. Acres	Change in Acres	Change in % of analysis area	Change in Acres	Change in % of analysis area
Structural Stage[1]					
Shrub/Seed/Sap	9,964	+787	+2	+16	+<1
Pole/Small	3,598	0	0	0	0
Immature/Med.	12,634	-283	-1	-110	-<1
Mature/Large	9,922	-504	-1	+94	+<1
Old Growth	7,584	0	0	0	0
Forest Type[2]					
Douglas-fir	8,686	-822	-2	-125	-<1
Grand fir	4,802	+69	+<1	+67	+<1
Hemlock	8,396	-150	-<1	-37	-<1
Western Larch	2,295	+552	+1	+55	+<1
Cedar	11,882	-108	-<1	-74	-<1
Ponderosa pine	500	+196	+<1	+107	+<1
Lodgepole pine	2,157	-40	-<1	-30	-<1
White Pine	1,860	+340	+1	+74	+<1
Subalpine fir	2,583	-37	-<1	-37	-<1

[1] Excludes non-forested areas (1,738 ac.)
[2] Excludes both non-forested areas (1,738 ac.) and areas with no known cover types (476 ac.)

The foreseeable activities of pre-commercial thinning and white pine pruning on National Forest land would help trend a relatively small number of acres towards the desired species composition. In addition, the reforestation that is scheduled for harvested areas within the Flat Moores and Tola timber sales will also help trend a relatively small number of acres towards the desired composition. However, at the watershed scale, this would have a small effect of achieving the desired condition. Harvesting in the future on the private land would likely continue to favor the less desirable species for retention. Therefore, it would add to the trend on National Forest lands of the forests becoming more and more dominated by less desirable species. Because forested private lands represent a relatively small amount of the total forested land (approximately 3%), this effect would be small.

Fire suppression efforts would continue to extinguish most wildfires while they are very small. Unless a wildfire escapes suppression and becomes large, the forests would continue their current trend towards becoming even more heavily dominated by shade tolerant species.

At the watershed scale, the distribution of structural stages would also trend away from the desirable condition. Regarding cumulative effects and forest structure, the kind of harvesting that is likely to occur on private lands in the future would favor the relatively young, smaller forest structural stages. However, because forested private lands represent such a small amount of the watershed, the cumulative effects to forest structure would be very small.

The average patch size for each structural stage in the Upper West Branch drainage is summarized in table 3-11. As previously mentioned, the desire is to increase the average patch size of the shrub/seedling/sapling structural stage while decreasing the patch size of the immature/medium structural stage. The No-Action alternative would not trend the landscape pattern towards the desired condition. The harvesting that is foreseeable on private lands may decrease patch sizes but this effect would be very small at the watershed scale because the private forest lands comprise such a minor amount (approximately 3%) of the entire forested land.

Table 3-11. Changes in Structural Stage Mean Patch Sizes (acres) in the Upper West Branch Watershed under each alternative. Existing condition figures includes both National Forest and private lands.

Structural Stage	Existing Condition and Alternative A (Acres)	Alternatives B and C		Alternative D	
		Acres	% Change	Acres	% Change
Shrub/Seed/Sapling	53.6	56.1	+5	54.4	+1
Pole/Small	47.4	47.4	None	47.4	None
Immature/Medium	93.7	91.2	-3	93.4	-<1
Mature/ Large	84.8	74.6	-12	82.8	-2
Old Growth	154.7	154.7	None	154.7	None

3. Alternatives B and C

Tables 3-10 and 3-11 illustrate how the composition and structure would be affected at the watershed scale. Because the watershed is very large relative to the number of acres that are proposed for treatment in these alternatives, the change to composition, structures and patch sizes that would occur as a percent of the watershed is very small. The ongoing and foreseeable future activities described above would affect the vegetation in similar ways to those that were described for the No-Action alternative. With the exception of fire suppression activities, the ongoing/foreseeable future activities would only have small effects on the composition, structure and pattern of forest vegetation. Although these effects would be insignificant at the watershed scale, the composition, structure and pattern of the forest vegetation would be trending towards the desired direction.

In order to conduct the regeneration treatments that are prescribed for some of the proposed units under these two Alternatives, forest openings would be created. Forest Service policy FSM 2470.3 and the Northern Regional Guide (USDA 1983) direct land managers to normally limit the size of tree openings created by even-aged silvicultural methods to 40 acres or less. With some exceptions, creation of larger openings is allowable with Regional Forester approval. Under Alternatives B and C, some of the proposed units would exceed the 40-acre opening size when considered with adjacent openings (see Vegetation section of the project file). When combined with adjacent, existing openings, these alternatives would create 13 openings larger than 40 acres. These range from 43 to 357 acres in size. The proposed openings would increase the average patch size in the watershed of the shrub/seedling/sapling structural stage. As described earlier, one desired future condition for the forest vegetation was to increase the patch size of this structural stage. Therefore, this effect would be beneficial. While the mean patch size for the shrub/seedling/sapling structural stage would still remain well below the historic size that likely occurred (see the Affected Environment, Landscape Pattern section for more details), the trend would be beneficial. In addition to considering historic landscape patterns, the effects that these openings would have upon the wildlife, watershed and visual resources was evaluated in this EIS.

4. Alternative D

Tables 3-10 and 3-11 depict how the composition and structure would be affected at the watershed scale. Like Alternatives B and C, the change to composition, structures and patch sizes that would occur with Alternative D at this scale is very small. The ongoing and foreseeable future activities described above would affect the vegetation in similar ways to those that were described for the No-Action alternative. With the exception of fire suppression activities, the ongoing/foreseeable future activities would only have small effects on the composition, structure and pattern of forest vegetation. These effects would be unmeasurable at the watershed scale.

As compared to the other action alternatives, the magnitude of the beneficial effects that would result from implementing this alternative is much smaller than Alternative B or C.

This alternative would not create any additional openings beyond what currently exists.

3.24d Consistency with Forest Policy and Legal Mandates

Forest Plan direction for the Idaho Panhandle National Forests provides that timber management activities will be the primary process used to minimize the hazards of insects and diseases and will be accomplished by maintaining stand vigor and diversity of plant communities and tree species (Forest Plan, p. II-8). Forest direction regarding vegetation is also guided by the Forest Plan standards for old growth (Forest Plan, p. II-29), timber (Forest Plan, pp. II-31 to 32), forest protection (Forest Plan, pp. II-38 to 39) and individual management areas (Forest Plan, pp. III-1 to 87). Analysis of how well the alternatives comply with forest plan standards and the National Forest Management Act requirements can be found in Appendix C.

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

A detailed report on TES plant species and Forest species of concern is in the project file. The following discussion summarizes that report.

3.31 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 the Endangered Species Act (1973) as amended; the National Forest Management Act (1976); the National Environmental Policy Act (1969); Forest Service Manual (2672.1-2672.43); Idaho Panhandle National Forests (IPNF) Forest Plan (1987); and direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants (WWFRP) program and Washington Office.

3.32 Affected Environment

3.32a Introduction

No federally listed Endangered plant species or US Fish and Wildlife species of concern are suspected to occur in the IPNF or project area. Three listed Threatened plant species are suspected to occur in the IPNF. Seventy-seven sensitive plant species and Forest species of concern are known or suspected to occur in the Kaniksu portion of the IPNF, which encompasses the Chips Ahoy project area.

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

3.32b Methodology

Assessment of TES plant species and habitat occurrence was accomplished through review of Idaho Department of Fish and Game Conservation Data Center (ICDC) Element Occurrence Records, National Wetlands Inventory maps, queries of the timber stand data base (TSMRS), aerial photographs and topographical maps, previous sensitive plant surveys, personal knowledge and professional judgment of the North Zone Botanist. Floristic surveys were conducted in proposed harvest units identified as having suitable habitat for rare plants. Other proposed harvest units were given at least a cursory survey to confirm low potential for rare plants and identify microsites of suitable habitat. Roads proposed for decommissioning were also surveyed for rare plants where suitable habitat was predicted to occur.

1. Field Survey Results

Field surveys were conducted in 1999 and 2003. An occurrence of western goblin (*Botrychium montanum*) was identified in moist forest riparian habitat in one proposed harvest unit. An occurrence of triangle moonwort (*B. lanceolatum*) and new occurrences of groundpine (*Lycopodium dendroideum*) were identified in another proposed harvest unit. Other occurrences of western goblin and Mingan moonwort (*B. minganense*), and occurrences of black snakeroot

(*Sanicula marilandica*) were identified in the project area, but are not in any proposed harvest units. Previously documented occurrences of groundpine, deerfern (*Blechnum spicant*) and northern starflower (*Trientalis arctica*) were confirmed in one proposed harvest unit. No other TES species or Forest species of concern were identified in the project area during the surveys, and most proposed harvest units were found to have low potential to support rare plants. Field survey notes are included in the project file.

2. Species Screen

The Council on Environmental Quality (40 CFR 1502.2) directs that impacts be discussed in proportion to their significance. Table 3-13 displays the level of analysis for TES plant species and Forest species of concern.

No suitable habitat for water howellia, Ute ladies'-tresses or Spalding's catchfly occurs in the project area. There is no suitable deciduous riparian or dry forest habitat in the project area. These species and guilds will not be discussed further.

No activities are proposed in or near any suitable aquatic, subalpine, cold forest or wet forest guild habitat that occurs in the project area. See the project file for a more detailed discussion of these habitat guilds. Suitable habitat for clustered lady's slipper (*Cypripedium fasciculatum*) may occur in the project area, but the species was not found in or near any proposed harvest units, and potential for its occurrence in proposed units was determined to be low.

Black snakeroot (*Sanicula marilandica*) occurs in the project area, but the areas in which it occurs are not proposed for harvest under any action alternative. Documented occurrences of deerfern *(Blechnum spicant)* in one proposed unit would be buffered from project activities through modification of unit boundaries. A qualified botanist would assist with unit layout to ensure protection of the deerfern occurrence and its habitat.

Based on the rationale presented above, none of the alternatives would affect these species. See the TES plants report in the project file for a more detailed discussion.

Species or habitat considered present and potentially affected by the proposed actions are carried forward into a detailed discussion and analysis in the Environmental Consequences Section. All documented sensitive moonwort and groundpine occurrences in proposed harvest units would be buffered from project activities. However, microsites of suitable moist forest habitat for moonworts and groundpine have been documented in a few proposed harvest units, and may be impacted by project activities. A discussion of the effects of the project on suitable moist forest habitat, even where no rare plants have been identified, is appropriate.

A previously documented occurrence of northern starflower and its peatland guild habitat occur in one proposed harvest unit. Although it would be buffered from direct impacts by modification of unit boundaries, discussion of the potential for indirect and cumulative impacts is warranted. No occurrences of green bug-on-a-stick moss (*Buxbaumia viridis*) were identified; however, suitable habitat occurs in some proposed harvest units. These species and habitats will be analyzed in detail.

Table 3-13. TES plant 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 or habitat 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 Species			
Water howellia (*Howellia aquatilis*)	✓		
Ute ladies'-tresses (*Spiranthes diluvialis*)	✓		
Spalding's catchfly (*Silene spaldingii*)	✓		
Region 1 Sensitive Species /Forest Species of Concern			
Deciduous riparian guild species	✓		
Dry forest guild species	✓		
Clustered lady's slipper (*Cypripedium fasciculatum*)		✓	
Subalpine guild species		✓	
Cold forest guild species		✓	
Aquatic guild species		✓	
Wet forest guild species		✓	
Deerfern (*Blechnum spicant*)		✓	
Black snakeroot (*Sanicula marilandica*)		✓	
Groundpine (*Lycopodium dendroideum*)			✓
Moonwort spp. (*Botrychium* spp.)			✓
Green bug-on-a-stick moss (*Buxbaumia viridis*)			✓
Northern starflower (*Trientalis arctica*) and peatland guild habitat			✓
Moist forest guild habitat			✓

3.33 Environmental Consequences

3.33a Methodology

Analysis was conducted using results of TES plant surveys, current population distribution of TES species and Forest species of concern in the project area and professional judgment. Methodology for cumulative effects analysis is discussed below in the Cumulative Effects section. The issue indicator for analysis of effects to sensitive and rare plants is the relative amount of canopy opening and/or ground disturbance in and adjacent to documented sensitive plant occurrences and/or highly suitable habitat. The issue indicator was determined based on the affinity of moist forest moonworts for relatively closed-canopy conditions (ICDC 2004) and their dependence on soil mycorrhizae, which may be destroyed during ground-disturbing activities. Ground disturbance and/or canopy removal were also considered for their effects on populations of groundpine, green bug-on-a-stick moss and northern starflower and on their habitats.

3.33b Direct and Indirect Effects

1. Direct and Indirect Effects Common to All Action Alternatives

a. Moonworts (*Botrychium* species)

Moonworts are seedless vascular plants that reproduce from spores and underground rhizomes. Western goblin (*Botrychium montanum*) often occurs with other rare moonworts, usually in wet or moist forest habitat and/or near streams and in soils with well-developed mycorrhizae[1]. Mingan moonwort (*B. minganense*) and triangle moonwort (*B. lanceolatum*) may also occur with other rare moonworts in or adjacent to wet meadows, open disturbed areas, old roads and roadside ditches. All three of these species were found in or near two proposed harvest units.

The documented moonwort occurrences and their habitats in the project area would be buffered from all project activities; therefore, there would be no anticipated direct impacts 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. Because individuals can go undetected during floristic surveys, they may be impacted by tree canopy removal and/or ground disturbance from project activities. Undetected individuals of these species in marginal to moderately suitable 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.

b. Groundpine (*Lycopodium dendroideum*)

Groundpine is a terrestrial clubmoss that reproduces both by rhizomes and spores. This mid-seral species declines in very old stands (Williams 1990). There are no known current threats to the populations of groundpine within the project area. Future vegetation and/or ground disturbance or reduction in forest canopy from natural or human-caused events (such as wildfire, windthrow or timber harvest activity) could impact groundpine populations and/or compromise habitat capability, depending on the severity of the disturbance.

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[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).

Studies have shown that low-intensity fire usually kills plants and destroys rhizomes in the litter layer, while rhizomes deeper in the soil persist to recolonize as early as the fifth growing month following fire (Williams 1990). By contrast, high-intensity fire could destroy even deeply rooted rhizomes.

Previous harvest activity in one area on the District with known occurrences of groundpine appeared to damage plants in landing areas and skid trails, while winter logging with snow cover minimized ground disturbance and impacts in most of the population (Penny 1996). It is unknown whether reduction of canopy cover stimulates the spread of groundpine, or if individuals have merely been able to survive around the edges of openings until eventual canopy closure allows recolonization (Penny 1996).

Previously documented occurrences of groundpine in one proposed harvest unit would be protected from project activities through modification of unit boundaries. The newly documented groundpine occurrence that would still be within the proposed harvest unit would be buffered from all project activities, so there would be no direct or indirect impact to this occurrence.

c. Green Bug-on-a-Stick Moss (*Buxbaumia viridis*)

Although no occurrences were found during the surveys, some units have microsites of suitable habitat for green bug-on-a-stick moss (*Buxbaumia viridis*). This inconspicuous moss usually occurs on soil or well-rotted logs in moist forest habitats to about 4,000 feet elevation (Lawton 1971). It often occurs, and can be confused with, the more common *B. piperi*. *Buxbaumia viridis* is a short-lived, ephemeral species.

Buxbaumia viridis is interruptedly circumboreal in distribution. In western Washington, it is suspected to be fairly common, but often overlooked (Harpel 2002 personal communication). Threats to the species include removal of woody debris that could provide suitable habitat and destruction of individuals by fire, tree felling and skidding operations. Loss of canopy cover is apparently not considered a threat to the species (Harpel 2002 personal communication).

Based on the above information, undetected individuals of this moss species could be impacted by project activities. Harvest and fuel treatments could also reduce the amount of available substrate for this moss (rotted logs in moist to wet forest habitat); however, well-rotted stumps and logs are widespread in forested habitats. The extent of loss of suitable substrate from project implementation would be considered incidental and temporary. Impacts to undetected individuals of this species or to suitable habitat would not lead to a trend to federal listing or loss of population or species viability.

There would be no direct or indirect impact to any other sensitive species of the moist forest guild not found in the project area.

d. Northern Starflower (*Trientalis arctica*)

Northern starflower is one of many sensitive peatland species that occur in specialized peatland habitats characterized by saturated soils and sphagnum mosses. Rarity of most peatland plants, including northern starflower, is considered to be largely due to the rarity of peatland habitats in northern Idaho. Northern starflower populations of 10,000+ plants have been documented in small peatland habitats in the Priest Lake Ranger District (ICDC 2002), so the species can be quite common within its very narrow habitat requirements.

Several potential threats to peatland habitats in north Idaho have been documented (Bursik and Moseley 1995). Most direct threats to peatland species and habitats are related to activities such as peat mining and cranberry harvesting. Grazing, logging, road construction and ongoing road maintenance in upland habitats adjacent to peatlands could lead to trophic changes within the peatlands and thus to changes in the wetland communities that might threaten the viability of rare plant populations (Bursik and Moseley 1995). Eutrophication occurs when sediment introduced into wetlands from upland sources raises the nutrient levels of those habitats; many rare wetland plant species occur in nutrient-poor to intermediate habitats, and tend to decline as nutrient levels increase (Bursik and Moseley 1995).

The northern starflower occurrence within one proposed unit occurs in a type of peatland known as paludified forest[2]. Discussions with the project hydrologist (Cobb personal communication) addressed the potential for nutrient and hydrological changes to the paludified forest that supports northern starflower from proposed commercial thinning in one unit upland of the occurrence. The stand currently has 90 percent crown closure; proposed treatments would reduce crown closure to 70 percent. The landform is relatively gentle. Given these considerations, it was determined that, with the mitigation measures proposed in Chapter II for sensitive plants and for protection of wetlands, commercial thinning as proposed would not result in sufficient canopy removal or ground disturbance to effect changes in the paludified forest.

2. Effects Common to Alternatives B and C

Alternatives B and C propose activities in the same amount of identified moist forest guild habitat that was confirmed by field surveys. Under both of these alternatives, approximately 488 acres of **moist forest guild** habitat identified in the coarse filter query would be potentially affected. Field surveys confirmed only about 91 acres of moderately to highly suitable moist forest habitat in proposed harvest units. Most such habitat occurs in riparian areas, which would be buffered from project activities according to INFS standards. INFS standards generally correspond to recommended buffers for suitable rare plant habitat. However, buffers around documented occurrences and highly suitable habitat are site-specific (see Chapter II – Common Features...).

3. Alternative A

Management activities would not change from current levels, and current vegetation trends would be expected to continue. No direct or indirect impacts to sensitive plants or suitable habitat would occur.

4. Alternative B

Proposed road construction under this alternative would not impact any highly suitable habitat, but could impact undetected sensitive moonworts in a few areas. As discussed above, negative survey results in the affected areas reduce the risk of occurrence of undetected individuals, and incidental impacts to undetected individuals would not lead to a trend to federal listing or loss of population or species viability.

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[2] Paludification occurs when rising water tables that result from accumulating peat begin to flood adjacent forest habitat. Paludification is thought to precede the formation of poor fen and true bog (ombrotrophic) habitats (Crum 1992). Signs of paludification include areas of standing water or saturated soils and occurrence of *Sphagnum* moss and other peatland species in forested habitats adjacent to open fens.

5. Alternative C

Under this alternative, there would be no new road construction, and no potential for effects to undetected sensitive moonworts from this activity.

6. Alternative D

Alternative D proposed activities in fewer acres of identified moist forest habitat than Alternatives B and C. One unit under Alternatives B and C that contains an occurrence of western goblin would not be harvested under this alternative. Under this alternative, approximately 192 acres of moist forest guild habitat identified in the coarse filter query would be potentially affected. Field surveys confirmed only about 81 acres of moderately to highly suitable moist forest habitat in proposed harvest units. Most such habitat occurs in riparian areas, which would be buffered from project activities according to INFS standards. INFS standards generally correspond to recommended buffers for suitable rare plant habitat. However, buffers around documented occurrences and highly suitable habitat are site-specific (see Chapter II – Common Features...).

3.33c Cumulative Effects

The cumulative effects area is the project area. The cumulative effects area is based in part on predicted seed dispersal distances (see TES plants report in the project file). In addition to the proposed activities, the following past, current, ongoing and reasonably foreseeable events apply to the cumulative effects analysis for TES plants:

Past Activities and Events

- Wildfire
- Timber harvest on public and private lands
- Road construction
- Residential development on private lands
- Grazing on public and private lands

Current and Ongoing Activities

- Road maintenance
- Grazing on private lands

Reasonably Foreseeable Actions

- Other Restoration Projects - noxious weeds monitoring and treatment, reforestation and timber stand improvement (tree thinning and pruning in plantations).
- Squaw Valley trail system maintenance
- Grazing on public and private lands

Cumulative effects to TES plant species or suitable habitat from proposed activities are generally described as follows:

- **very low** = no measurable effects on individuals, populations or habitat
- **low** = individuals 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 that could support TES plant species

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

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

1. Alternative A

Implementation of the No Action alternative would not contribute any cumulative effects to rare plants.

2. Cumulative Effects Common to Alternatives B, C and D

a. Proposed Activities

As discussed above under Direct and Indirect Effects, there is little actual difference between the action alternatives with regard to effects to rare plants. The project activities were determined as having potential under all of the action alternatives to impact undetected individuals of sensitive moonworts and green bug-on-a-stick moss, and could impact suitable habitat for these species and for groundpine.

With the mitigation measures detailed in Chapter II, and based on the professional judgment of the project Botanist, there would be no difference in cumulative effects to rare plants and rare plant habitat between the action alternatives from project activities when combined with the following activities and events.

b. Past Activities and Events

Past wildfires, timber harvest, road construction, private residential development and grazing on public and private lands have likely affected populations of and/or habitat for green bug-on-a-stick moss, groundpine and sensitive moonworts through ground disturbance, canopy removal and/or the introduction of exotic plant species. Past grazing in Big Meadows may have impacted habitat for and/or populations of northern starflower and other rare peatland species. Other sensitive plant species that occur in the project area may have also been impacted.

c. Current and Ongoing Activities

Road maintenance activities would occur mostly in areas with low suitability as rare plant habitat. Site-specific surveys would be conducted as needed before implementation of any road decommissioning and appropriate mitigation measures as described in Chapter II would be implemented if necessary. Removal of culverts at stream crossings may directly impact a small amount of suitable habitat for sensitive moonworts, and undetected individuals may be directly impacted. Because of the limited amount of habitat disturbance, no trend to federal listing or loss of population or species viability would be expected to occur.

Grazing on private lands in the project area are likely to continue their impacts to suitable sensitive plant habitat, including habitat for and/or populations of the sensitive plant species under discussion. The extent of impacts to populations and suitable habitat on private lands is unknown.

d. Reasonably Foreseeable Actions

Other Restoration Projects – Reforestation, white pine pruning and tree thinning would occur mostly in areas with low potential to support rare plants. No ground disturbance would occur with pruning or thinning, and only minor ground disturbance would occur with reforestation. No significant canopy reduction would occur. Other than possible incidental effects to undetected individual moonworts, no impacts to rare plants would be expected to occur.

Weed treatment and monitoring would follow guidelines established in the Priest Lake Noxious Weeds Control Project EIS (USDA 1997). Effects to rare plant species were analyzed in that document and its adaptive strategy. No effects to rare plants beyond those described in that EIS are expected to occur.

Squaw Valley Trail System Maintenance – maintenance and reconstruction activities on trails in the project area would have the potential to cause minor amounts of disturbance to suitable sensitive plant habitat. Rare plant surveys would occur as needed before implementation of such projects. Incidental impacts to undetected rare moonworts and bug-on-a-stick moss could occur.

Grazing on public and private lands – would have the potential to impact sensitive plants and suitable habitat as described above for past activities and events. Any new grazing allotments in the project area (and on all National Forest lands) would be subject to NEPA analysis with regard to TES plants. The one allotment still active in the project area would be subject to NEPA analysis before its renewal.

e. Summary of Cumulative Effects

Based on the above analysis, and in consideration of foreseeable, ongoing and current activities, cumulative impacts to sensitive moist forest moonworts and green bug-on-a-stick moss 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, and habitat capability would not over the long term be reduced below a level that could support the species). Cumulative impacts to suitable moist forest guild habitat would be expected to be low.

Based on the above analysis, and given mitigation measures described in Chapter II, cumulative impacts to groundpine and to northern starflower and its peatland habitat would not be expected to occur under any action alternative.

3.33d 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, p. II-1). A Forest Plan standard for sensitive species is to "manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to Federal listing under the Endangered Species Act" (USDA 1987, p. II-28). The Forest Plan also identifies the need to "determine the status and distribution of Threatened, Endangered and Rare (sensitive) plants on the IPNF" (USDA 1987, p. II-18). All alternatives would meet Forest Plan direction, as well as NFMA requirements for maintaining population and species viability.

Across the Forest, suitable habitat for sensitive plant species appears to be well distributed. Approximately 625,000 acres have been identified as having the potential to support sensitive plant species in a wide array of plant communities. To date approximately 72,531 acres (about ten percent) of suitable habitat have been surveyed for sensitive plants (USDA 2002).

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

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

At the project level, to prevent further declines in populations of sensitive species, suitable habitat has been identified and surveyed, and all documented occurrences of sensitive moonworts would be protected from disturbance.

3.4 Noxious Weeds

3.41 Regulatory Framework

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

- National Forest Management Act (NFMA) (1976)
- National Environmental Policy Act (NEPA) (1969)
- Forest Service Manual (Chapter 2080, as amended) (2000)
- Executive Order #13112 (1999)
- IPNF Forest Plan (1987)
- IPNF Weed Pest Management EIS (1989)
- Priest Lake Ranger District Noxious Weed Control Project EIS (1997)

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

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

Weed management activities in the District are guided by the Priest Lake Noxious Weed Control Project EIS. Copies of the EIS are available at the District office.

Noxious weeds are those plant species that have been officially designated as such by Federal, State or County officials. In *Weeds of the West* by Whitson et al. (1991), a weed is defined as “a plant that interferes with management objectives for a given area of land at a given point in time.”

The Federal Noxious Weed Act of 1974 defines a noxious weed as "a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States or the public health" (P.L. 93-629).

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

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

3.42 Affected Environment

3.42a Methodology

Information on current weed infestations and results of weed management in the project area is derived from past and recent weed surveys and from observations during field surveys for Threatened, Endangered and sensitive plants. Details of past surveys and treatment in the project area are in the project file. The findings of those documents are incorporated by reference and summarized below.

1. Documented Noxious Weed Infestations

Current known weed species and infestation levels in the project area include spotted knapweed (heavy), goatweed (heavy), common tansy (moderate), oxeye daisy (moderate), meadow hawkweed (heavy), orange hawkweed (heavy) and Canada thistle (moderate)[1].

The heaviest weed infestations are found on roads and trails. These areas are also most susceptible to weed spread, and they serve as corridors for weed spread into recently disturbed forest habitat. Noxious weeds also occur on adjacent private land in Big Meadows; weeds likely also occur on other private lands in the project area.

2. Current Weed Management Efforts

Spotted knapweed, goatweed and common tansy are widely established and considered naturalized in the project area. Management of these species will emphasize reducing infestation levels and slowing their rate of spread. Meadow hawkweed, common tansy, oxeye daisy and Canada thistle are currently established but not considered naturalized in the project area. Infestations will be monitored and contained, with eradication where feasible.

Of major concern are potential new invaders (see project file) not yet documented in the watershed. In accordance with guidelines in the Northern Region Overview (USDA 1998),

[1] Weed infestation levels are defined in the project file. Very heavy infestation levels indicate that infestations are widespread at a heavy level in disturbed areas of the watershed, while very low levels indicate that only isolated small populations have been documented.

management priorities emphasize identification and eradication of tansy ragwort, leafy spurge, and yellow starthistle. Some additional weed species listed as noxious in Bonner and/or Pend Oreille County and recorded as occurring there have not yet been documented in the project area. These species would be a high priority for eradication if any individuals were observed during operations or monitoring in the project area.

Several roads in the project area have been treated or are planned for treatment under the Priest Lake Noxious Weed Control Project FEIS (site numbers are as listed in the FEIS). They include Road 312 (portion of site #81); Road 461(site #84); Roads 1308 and 1308H (site #88); and Roads 461A, 461B, 461C, 461D, 2292, 2292B, 2292C, 2292F and 2292G (site # 91). Roads 312 and 1308 were chemically treated in 2002. Forest Roads 1308A, 1308E, 1308F, 1308G, 2237, 2237A, 2292D, 2292E and 2292H have been recommended for treatment under the Priest Lake Noxious Weed Control Project FEIS adaptive strategy (USDA 1997).

Weed management efforts in the district have increased substantially since 1997. Consistently higher funding for weed treatment and the inclusion of weed treatment and prevention practices in timber sale contracts since 1997 have increased the likelihood of success in containing and reducing weed infestations in the project area and throughout the district. Information on appropriated and Knutsen-Vandenberg funding levels for weed management since 1997 is included in the project file.

The extent and success of weed treatments on private lands are unknown.

3.43 Environmental Consequences

3.43a 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 project activities. The estimation of risk of weed spread and introduction of new weed invaders from the proposed activity is based on peer-reviewed literature, 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 on predicted amount of soil and/or understory vegetation disturbance.

Analysis of effects to noxious weeds of 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 weeds. The effects of commercial thinning would be similar to those of selective harvest.
- Regeneration treatments would remove a significant portion of the canopy (greater than 70 percent), and would treat fuels with site preparation. This type of harvest carries a greater risk of weed spread than selective harvest or 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.

3.43b Direct and Indirect Effects

1. Alternative A

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. It is likely that treatment of Forest roads in the project area would continue as needed to protect the investments made in previous years. Treatment needs are expected to decrease over time as more desirable species establish along those roads. With implementation of the No Action alternative, seeds from any weeds on Forest roads in the drainage may still be transported within and out of the area by vehicles, people, birds, and wildlife.

2. Alternative B

There would be a risk of weed spread associated with new road construction. Preventive seeding and monitoring as proposed would reduce, but not eliminate, the risk of weed spread. Based on past monitoring (see project file), preventive seeding and monitoring would greatly reduce the risk of new invaders becoming established. Following decommissioning of temporary roads and preventive seeding, the risk of weed spread would decrease over time as desired species become established.

3. Alternative C

Because there would be no new road construction under this alternative, there would be slightly less risk of weed spread than under Alternative B. There would be less ground-based harvest under this alternative, resulting in less soil and understory vegetation disturbance, and less risk of weed spread.

4. Alternative D

Because fewer acres would be treated under this alternative, and because no regeneration harvest would occur, there would be less ground or canopy disturbance and a lower risk of weed spread than under Alternative B or C.

5. Direct and Indirect Effects Common to Alternatives B and C

With regard to the predicted amount of canopy removal, there is little difference between Alternatives B and C, thus no difference in its effect on the risk of weed spread. Oxeye daisy in particular tends to increase with expansion of canopy openings. Potential for spread of this species from project activities associated with canopy removal would be low to moderate under both action alternatives. Based on past monitoring (see project file), successful weed treatment would remove the majority of new seed source, which occurs in greater concentrations on roadsides, and would slow the rate of spread of weeds within the project area.

6. Direct and Indirect Effects Common to Alternatives B, C and D

There is a risk of weed spread from ground disturbing project activities, particularly along skid trails. 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 II).

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

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.

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 are considered naturalized in the watershed in both previously disturbed and undisturbed habitats. Both may increase, at least temporarily, in some areas following harvest and fuels treatment activities. While there are limited data addressing response of weeds to fire, initial studies of spotted knapweed indicate that both low and high intensity fires may increase knapweed canopy cover by four to six times over preburn densities (Rice and Sacco 1995). 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.

3.43c 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 project area is possible, with occasional transport over long distances (such as on vehicles). However, it would be difficult to predict the extent of such long-distance dispersal. It is likely that most seeds of noxious weeds would fall close to the parent plant.

In addition, road systems and lands adjacent to the project area have noxious weed infestations similar in composition and distribution to those in the project area, 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 with regard to noxious weeds from proposed activities are generally described as very low, low, moderate or high, with the following definitions:

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

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

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

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

The period for measuring short-term cumulative effects to noxious weeds and susceptible habitat is ten years following completion of harvest and other restoration projects, or, in the event of selection of the No Action Alternative, ten years after the date of the signing of the Record of Decision. The ten-year period is based on the expected recovery and/or establishment of desired species in disturbed areas. Long-term irretrievable effects to noxious weeds from loss of canopy cover are addressed below.

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

Past Activities and Events

- Wildfire
- Timber harvest on public and private lands
- Road construction
- Residential development on private lands
- Grazing on public and private lands

Current and Ongoing Activities

- Road maintenance
- Grazing on private lands

Reasonably Foreseeable Actions

- Other restoration projects - noxious weeds monitoring and treatment, reforestation and timber stand improvement (tree thinning and pruning in plantations).
- Squaw Valley trail system maintenance
- Grazing on public and private lands

1. Cumulative Effects Common to All Alternatives

Under all alternatives, cumulative effects with regard to new invaders are expected to be low. Under Alternative A, 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 would become established. Under Alternatives B, C, and D, 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:

a. Past Activities and Events

Past wildfires, timber harvest, road construction, private residential development and grazing on private and public lands provided areas of disturbance of soil, vegetation and canopy cover for invasion by non-native plant species, including noxious weeds. Because of inadequate past weed prevention and control practices, the effects of these activities on noxious weed spread are still evident.

The loss of canopy cover from past timber harvest 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 another 20-30 years or more.

b. Current and Ongoing Activities

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.

Grazing on private lands carries with it the risk of weed spread within those lands. Approximately 800 acres of private lands in the project area are either being grazed or are in hay production. Neither of the two allotments in the project area is currently being grazed (see below). However, because there is inadequate fencing between public and private lands in the lower Squaw Valley, cattle could continue to move between private and public lands and spread noxious weeds.

c. Reasonably Foreseeable Actions

Noxious weed treatment and monitoring would follow guidelines established in the Priest Lake Noxious Weeds Control Project EIS (USDA 1997). The risk of new invaders becoming established would be low. Mitigation measures to reduce the risk of weed spread in the watershed as a result of project activities would protect recent investments in weed management on FS 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 detail in the Priest Lake Noxious Weed Control Project Environmental Impact Statement (USDA 1997), hereby incorporated by reference. A site-specific summary follows:

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 other weed species, which are mostly confined to road prisms, would be moderately to highly effective in reducing their spread within the project area. However, there will likely be a continued need for some level of weed treatment if weed infestations on adjacent private lands are not controlled.

Squaw Valley trail system maintenance could cause small amounts of soil disturbance, with a slight increase in the risk of weed spread.

Grazing on public and private lands would carry the risk of weed spread, particularly when livestock move from untreated private lands to public lands. The Upper Squaw Valley allotment has not been grazed for the last two seasons so that the Forest Service could accomplish weed treatments and the permittee could accomplish reseeding. The Lower Squaw Valley allotment expired in 2000 and was not renewed. This allotment may or may not be grazed in the future, pending completion of NEPA analysis. Future NEPA analysis of grazing allotments in the project area (and on all National Forest lands) will consider the impact on noxious weed introduction and spread, with mitigation measures to reduce the risk of weed spread. Any untreated infestations on private lands could spread to public lands, not only from livestock but also from seeds borne on wildlife and wind.

2. Cumulative Effects Common to Alternatives B, C and D

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

a. Proposed Activities In Alternatives B, C, and D

Short-term cumulative effects regarding susceptibility to weeds would be associated with ground disturbing activities proposed in the action alternatives. Proposed mitigation (see Chapter II – Common Features...) 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 harvested and/or underburned would decrease. This process could take a total of 40-50 years.

b. Reasonably Foreseeable Actions

Timber Stand Improvement and Reforestation - No increase in noxious weed spread is predicted from implementation of activities (tree thinning and pruning in plantations), since no ground disturbance or significant canopy removal would occur. 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.

3.43d Consistency with the Forest Plan

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 B, C, and D 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. 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.

3.5 Wildlife

3.51 Regulatory Framework

Regulatory direction applicable to the management of wildlife resources includes:

- 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 Land and Resource Management Plan (Forest Plan, USDA 1987) and
- Forest Service policy.

The US Fish and Wildlife Service has identified five listed wildlife species that may occur on the Idaho Panhandle National Forests (USDI Fish and Wildlife Service 2002). 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 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 and management indicator species (USDA Forest Service 1995, Letter to Forest Supervisors in Regions 1, 4, and 6). A summary of the conclusion of effects for all sensitive species can be found in Appendix D.

3.52 Affected Environment

3.52a Introduction

Ecological disturbances (e.g. landslides, fire, insect and disease outbreaks) lay the foundation for landscape patterns and strongly influence wildlife populations. Disturbances that arise from natural processes or human actions can alter these landscape patterns and wildlife habitat, directing wildlife abundance and composition. Wildlife species will occupy their preferred niche on the landscape, and move from place to place as forest structures change and different habitat conditions develop (Clark and Sampson 1995). Consequently, wildlife species will not necessarily persist indefinitely in areas where they are found today because of the dynamic and shifting environments in which they live.

In the absence of disturbance, vegetation follows a gradual and more predictable sequence of change called succession. As vegetation moves through each stage of succession, the composition of wildlife species shifts accordingly. Many 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.

3.52b Characterizations of Habitats

The distribution and abundance of wildlife is primarily a function of habitat conditions such as vegetation type and successional stage. These conditions reflect inherent fixed attributes as described in the discussion of capable habitat for each species, as well as disturbance frequencies and types (such as fire, windthrow, landslide, and insect outbreaks). In addition to altering habitat due to direct impacts such as 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, weather, and timber harvesting have been major disturbances that shaped the vegetation and thus the wildlife habitats within the Chips Ahoy project area.

3.52c Methodology

1. Species Screen

The Council on Environmental Quality (40 CFR 1502.2) directs that NEPA documentation will discuss impacts in proportion to their significance. Some wildlife require a detailed analysis/discussion to determine effects on that particular species. Others may not be impacted, may be impacted at a level that is inconsequential, or any potential effects can be 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 for this project tiered to the following documents and used a variety of information including scientific literature, resource inventories, and sighting records:

- Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin
- Idaho Panhandle National Forests Land and Resource Management Plan

Available Conservation Assessments and Strategies for wildlife species
Table 3-14 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.

3.52d 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 if any one of the alternatives was implemented.

1. Species Not Analyzed in Detail

Supporting rationale is presented in Appendix D for those species that are presumed to be present but not necessarily affected by the proposed actions.

Table 3-14. 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 Appendix D 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 (*Plecotus townsendi*)		✓	
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*)		✓	
Moose *(Alces alces)*		✓	
White-tailed deer (*Odocoileus virginianus*)			✓
Forest land birds			✓
Snag Habitat		✓	

3.52e Species Analyzed in Detail

1. 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, G. M. and J. D. Brittell. 1990). Primary habitat that contributes to lynx habitat is higher elevation lodgepole pine, subalpine fir, and Engelmann spruce habitats. Secondary vegetation, when interspersed with subalpine forests, includes cool, moist Douglas-fir, grand fir, western larch and aspen forests (Ruediger et al. 2000).

Lynx use both ends of the forest successional spectrum -- young-aged stands where they hunt for snowshoe hares, and mature stands where they have their kittens. Ideally, quality lynx habitat would include a mosaic of the vegetative patterns across the landscape, providing sustainable forage in juxtaposition to denning habitat.

As a specialized predator, lynx have stratified or separated themselves from other competitors by unique adaptations. Their large feet and long legs permit lynx to move easily over the snow, enabling them to find a niche at higher elevations where snow persists much of the year, thereby, giving them a competitive advantage with other competitors (e.g. bobcats, cougars, and coyotes).

Risk factors that can impact lynx populations include alteration of forest habitats and changes to linkages for movement.

a. 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 the 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).

See Figure H-11, Appendix H for a map of Pelke and Upper West Branch lynx analysis units showing groomed snowmobile routes and snowmobile play areas.

b. 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. LAUs are not intended to depict actual lynx home ranges, but are intended to provide analysis units of the appropriate scale with which to analyze potential direct and indirect effects of projects or activities on individual lynx, and to monitor habitat changes.

The project area is located partially within the Pelke LAU and the Upper West Branch LAU. Both analysis units were delineated to approximate the average home range of a male lynx and are used to display cumulative impacts to habitat conditions by proposed management actions (Ruediger, et al., pp. 78-79). According to the Canadian Lynx Conservation Assessment and Standards (2000), LAUs should be at least the size of area used by a resident lynx and contain sufficient year-round habitat (p. 77). The size of an LAU should generally be 16,000 to 25,000 acres in contiguous habitat, based on scientific research regarding home range sizes of lynx (ibid, p. 9).

The Pelke LAU is approximately 19,717 acres in size and the Upper West Branch LAU is approximately 26,408 acres in size. Both LAUs include a mixture of foraging, denning, and currently unsuitable habitats (table 3-15). These LAUs share numerous older larger timber harvest units that currently provide high quality habitat for snowshoe hares.

Table 3-15. Habitat conditions within the Pelke and Upper West Branch lynx analysis units.

Lynx Habitat Attributes	**Upper West Branch Lynx Analysis Unit**		**Pelke Lynx Analysis Unit**	
	Acres	**Percent**	**Acres**	**Percent**
Denning	3,226	14	7,391	38
High Quality Forage	4,198	18	4,665	24
Low Quality Forage	13,677	58	5,683	29
Unsuitable	2,285	10	1,627	9
Total	23,386		19,365	
Unsuitable within last Decade	434	2	254	1

2. 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. Fall habitats are generally associated with timbered habitats and riparian habitats. The decline in numbers is related to habitat loss and direct and indirect human-caused mortality (USDI 1993).

a. 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. The centers include the Cabinet-Yaak and Selkirk ecosystems in northeastern Washington, northern Idaho and northwestern Montana. The historical distribution of grizzly bears has been well documented (Interagency Grizzly Bear Committee, 1987; USDI Fish and Wildlife Service, 1993; Volsen, David P. 1994). The pre-settlement distribution of grizzly bears included the entire Priest Lake drainage and would have encompassed all of the Chips Ahoy Project Area.

Historic reference of grizzly bear populations was first noted in accounts by Klockman (1910), although no reference to population size was noted. Reference by naturalist, Merriam (1933), noted that the Priest Lake area was one of the last great strongholds for grizzly bears within Idaho. Layser (1978) and Zager (1981) recorded further documentations of grizzly bear sightings, occurrence, and habitat values, some of which occurred within the Upper West Branch drainage.

b. Existing Condition

The Chips Ahoy project area lies south of the Selkirk grizzly bear recovery area. Although the area is not designated for grizzly bear recovery, sighting and observation reports suggest more than just occasional use of the area by grizzly bears. Use of this area by grizzly bears has been well documented since 1986, with the most recent grizzly bear use of this area documented in November 2003. In May 2001, a female with two cubs was documented utilizing this area. Both cubs were trapped after receiving reports of this family group feeding on a cow. Once trapped the bears were fitted with radio collars and later released approximately 27 miles to the north of the capture location. In October 2002, one of the radio-collared bears was illegally shot during the big game hunting season while feeding on some carrion that was adjacent to an open road.

The whole Chips Ahoy project area represents approximately 43 percent of the entire 151 square mile area utilized by grizzly bears south of the current recovery area on the Priest lake Ranger District (see Figure H-12 in Appendix H showing Grizzly Bear Use Area outside the designated recovery zone). Within this area, 483 miles of open drivable roads and 28 miles of motorized trails result in 511 miles of drivable routes. This results in an open road density of approximately 3.4 miles per square mile. The total road density is similar to the open road density due to the fact that all restricted roads within the analysis area are considered as open roads since closures are only for a short timeframe during the fall when there is a need to protect soft road surfaces from damage.

Quality spring habitat is found along Tola Ridge, Flat Creek, Goose Creek, Lamb Creek and the Upper West Branch. Summer habitats are associated with timber management areas with berry-bearing shrubs and along natural openings on North Baldy, South Baldy and Gleason Mountain. Fall habitats are located throughout the area. Denning habitat, which has been identified by slope, elevation, aspect and land type, is located with the vicinity of Gleason Mountain, North Baldy, South Baldy and Hungry Mountain.

3. 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).

a. Reference Condition

Historically, ecosystems in north Idaho were shaped by disturbance patterns that altered the size and distribution of forest structure across the landscape. These forests periodically experienced both small and large natural disturbances (primarily fire) that altered landscapes from less than one hundred acres to thousands of acres at a time. Before human influences, forests in different structure classes, including post-fire habitat, were randomly distributed across the landscape (Oliver, C. 1992). Consequently, post-fire habitat for black-backed woodpeckers was maintained by these random disturbances.

b. Existing Condition

There have been a number of observations of black-backed woodpeckers on the Priest Lake Ranger District, including four within 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 harvest, road construction and firewood cutting along 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 beetle), resulting in higher levels of tree mortality. In root disease pockets and areas infected with the Douglas-fir 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 the 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 diameter at breast height) are relatively abundant in the Chips Ahoy project area.

4. 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 (Reynolds, R. T., and B. D. 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 (Reynolds, R. T., and B. D. Linkhart 1992) noted a stronger correlation between prey availability and this cover type than with other common western conifers.

a. 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 Priest 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.

b. Existing Condition

Approximately 21 percent of the Chips Ahoy project area represents drier forest habitats commonly associated with use by flammulated owls (See figure H-13 in Appendix H showing flammulated owl habitat within the Upper West Branch drainage). These drier habitats tend to produce older, single strata ponderosa pine/Douglas-fir communities, which in turn often provide the necessary habitat attributes for flammulated owls.

However, similar to the findings in the 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 with the Tola Ridge area of the Chips Ahoy project area in 1998, 1999, and 2003. Four responses from flammulated owls were detected in 1998, but surveys since that time have failed to determine the presence of flammulated owls. In 2002, flammulated owl nest boxes were placed in potentially suitable habitat along Tola Ridge. 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 approximately 45,433 acres, and 9,503 of these acres (21 percent of the analysis area) are classified as capable habitat. Currently, there are 210 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 along Tola Ridge and on southern exposures within the Pelke Ridge area.

5. Northern Goshawk

The northern goshawk is a forest habitat generalist that uses a wide variety of forest age classes, structural conditions, and successional stages, inhabiting mixed coniferous forests in much of the northern hemisphere (Reynolds et al. 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.

a. 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 Priest Lake drainage historically contained a greater proportion of old growth than it currently does. 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 (dry) 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 the landscape scale, at least three suitable nest areas should be provided per home range (5,000 to 6,000 acres) to provide long-term nesting habitat for goshawks. The minimal stand size for goshawk nest sites is 30 acres, with all nest sites best located within 0.5 mile of each other (Reynolds et al. 1992). Post-fledging areas have not been an issue on the Idaho Panhandle National Forests because nesting habitat, not foraging habitat, appears to limit the numbers of goshawks.

b. Existing Condition

White pine blister rust, fire exclusion and past timber harvest have changed the species composition of stands within the Chips Ahoy 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. Suppressing wildfires since the early 1900s has also altered stand structure on the landscape. Much of the capable habitat within the project area is occupied either by immature forest stands, or younger stands.

Approximately eight goshawk territories, some with multiple nests, have been recorded on the Priest Lake Ranger District. There is one recorded territory within the Chips Ahoy project area, which was located during the summer of 2003 during a search for nests. Two additional goshawk nest locations within the Upper West Branch drainage are located outside of but close to the project area.

The Chips Ahoy project area contains 27,628 acres of capable goshawk habitat, and 6,103 of these acres are modeled as currently suitable for nesting (see figure H-14 in Appendix H showing Goshawk nesting habitat within the Upper West Branch drainage). Most of the suitable nesting habitat is located within the Pelke Ridge area within only lesser amount located along Tola Ridge. The documented nest site within the project area is within habitat modeled as suitable.

6. 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.

a. Reference Condition

Fishers were much more abundant historically than they are today. H.C. Lindsey recorded in his journal in 1889 that the Pend Oreille drainage just west of the assessment area was "full of...fisher..." In one year he and his partner hunted and trapped in the Pend Oreille drainage, harvesting 50 fishers and other wildlife. His one-year take was greater than current estimated fisher population for the assessment area. The historical record indicates that fishers were extirpated from much of their historic range before humans had a pronounced influence upon the composition and structure of the western landscape. Exploitation (trapping) may have been the primary cause for the decline of fishers throughout their historic range. Habitat loss from extensive fires in the early 1900s also contributed (Jones 1994). Even in areas where fisher are protected from trapping, incidental trapping mortality may limit population growth (Jones 1991, Roy 1991, Heinemeyer 1993).

INFS and other riparian management guidelines protect some fisher habitat, but do not extend far enough from streams to protect all fisher habitat. Idaho state law protects this species because the Department of Fish and Game recognizes the fisher as a Category A Species of Special Concern. This is a species, which is low in numbers or limited in distribution or has suffered significant habitat loss within a significant portion of its range in Idaho. The Idaho Conservation Data Center ranks it as S1 – "critically imperiled because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction (typically 5 or fewer occurrences)." Fishers have been listed as a threatened species by the state of Washington and it is believed that habitat loss, over harvest and fragmentation of habitat have contributed to their decline.

Much of the capable habitat has undergone considerable logging or stand-replacing fires in the last 100 years. Logging of riparian habitats and preference for harvesting the larger, older trees has resulted in a reduction of suitable fisher habitat in much of the assessment area. Intermingled ownerships, where private lands have less mature and old growth forest, have contributed to habitat fragmentation in areas such as Lower Priest River.

b. Existing Condition

Fisher have been documented on the Priest Lake Ranger District since historical times through the present. The last reported fisher within the Upper West Branch Area was in 1999. Fisher have been recently reported within the Lower West Branch drainage to the south and within the Kalispell Drainage to the north. The largest proportion of the occurrences records come from the northern portion of the Priest Lake Ranger District.

Approximately 92 percent, or 41,768 acres, of the Upper West Branch drainage is capable habitat for fisher. Capable habitat refers to the inherent potential of the site to produce essential habitat requirements of a species, generally fixed attributes. The vegetation on the site may not be currently suitable for fishers because of variable stand attributes such as inappropriate seral stage, cover type or stand density. For fishers, capable habitat is generally defined as potential moist forest types and includes habitat type groups 2 through 6, which are the moderately dry Douglas-fir to the moist grand fir, western red cedar and western hemlock types. Suitable habitat for fishers is habitats that currently has both the fixed and variable stand attributes for a given species' habitat requirements. For fisher, suitable habitat is defined as mature or older habitats with a dense overstory (greater than 50 percent). Within the Upper West Branch drainage 26 percent, 10,730 acres, are currently within a suitable condition. Previous timber harvest within 37 percent, 15,649 acres, of the capable habitat has likely contributed to the low level of suitable habitat within the drainage.

7. 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 an 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). For nesting, they have specific requirements of large trees in relatively uncut stands. Nest cavities are usually located more than 30 feet above the ground, at a level with the canopy of the surrounding forest (Warren 1990).

a. Reference Condition

As discussed previously in the black-backed woodpecker section, snag habitat within the Chips Ahoy area has been strongly influenced by vegetation succession and timber management and to a lesser extent by natural fire events. Most of the snags created within the area are the product of natural mortality caused by insects and disease. Because most of the larger fires within the area, with the exception of the northwestern portion, occurred in the late 1800s, current snag abundance is not a result of previous fire history.

Old growth and mature habitat, which are commonly associated with pileated woodpecker habitat, is relatively abundant within portions of the project area. Larges areas of old growth and mature habitat are found in abundance within the Pelke Ridge area and within the southern portion of the project area. Large diameter snags occur frequently within these areas. Remnant western larch and ponderosa pine snags occur infrequently throughout the project area.

b. 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 Chips Ahoy assessment area. Consequently, the habitat in this area is in decline for species associated with large snags, such as the pileated woodpecker.

Within the project area, there are 41,789 acres of capable pileated woodpecker nesting habitat, and 17,507 of these acres are currently suitable. Most of the suitable habitat is located around Pelke Ridge, Consalus Creek, and Solo Creek.

8. 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 actually 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 (Compton1999). Severity of winter appears to be the most limiting factor (Compton 1999).

Climatic factors affect the seasonal variation of forage quality and quantity, accessibility to foraging areas and the energetic requirements of 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.

a. 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, B.B. tech. ed.1999). Within the Priest River drainage, four primary area are of extreme importance for wintering white-tail deer. These include: the shoreline of Priest Lake from Kalispell Bay to the outlet of the lake, the west slopes above the southeastern shore of Priest Lake, the Dickensheet area and Jackpine Flats. The Dickensheet Area is located within the Chips Ahoy project area.

b. Existing Condition

White-tailed winter range is located within the extreme portion of the project area along the eastern portion of Tola Ridge and the lower elevation areas along the Lower Priest River. Mapped winter range within these areas totals approximately 4,123 acres. Approximately 15,595 acres or 39 percent are within a condition that would function as winter cover.

9. Forest Land Birds

a. Reference Condition

Hejl (1994) acknowledges that while we do not know all of the specifics of bird-habitat relations, we do understand many principles that would help maintain a healthy forest for most bird species:

- Encourage old-growth characteristics,
- Leave snags and replacement trees,
- Leave or plant the natural diversity of trees found in the area,
- Burn and allow fires to happen in a manner similar to natural fire regimes,
- 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 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).

b. 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 Chips Ahoy assessment area have become congested by dense understories of shade-tolerant species. If this important habitat component continues to withdraw in extent, forest land birds dependent upon open-grown dry-site conditions will decline. No single forest condition or structural type will benefit all species. Providing a mosaic of habitat conditions containing a variety of habitat components or niches will maximize habitat values for forest birds.

3.53 Environmental Consequences

3.53a Introduction

This section displays and discusses the effects on those wildlife species identified in the Affected Environment section as possibly being influenced by the proposed actions. Effects discussions include direct, indirect and cumulative effects, any of which may have positive or negative consequences.

3.53b Cumulative Effects Analysis

Past actions and other disturbances have laid the foundation for today's forest vegetation and are depicted and 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 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 the Scope of Analysis in Chapter I).

The appropriate scale or geographic bounds for a cumulative effects analysis relates to an area that would be influenced by the proposed action or reasonable alternative. This area is referred to as the project impact zone or cumulative effects analysis area, and may vary between individual species. 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 (for example, watershed boundaries), and boundaries that represent the point of diminishing potential effects (Table 3-16).

1. Lynx

Lynx Analysis Units (LAU) were delineated for the Priest Lake Ranger District following standards outlined within the Lynx Conservation Assessment and Strategy (LCAS; Ruediger et al. 2000). LAUs are 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 are likely to 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.

2. Grizzly Bear

The US Fish and Wildlife Service and the US Forest Service have identified areas outside recovery zone boundaries that are known to be currently used by grizzly bears. The Chips Ahoy project area overlaps with an area on the Priest Lake Ranger District that has been identified as being used by grizzly bears outside of the current recovery area. This area was used to evaluate cumulative effects on grizzly bears. While this area approximates a normal adult grizzly home range, all ongoing activities within this area outside the recovery zone have been incorporated into the environmental baseline.

3. Other Species

For most of the other species analyzed, the cumulative effects analysis area is defined as the Upper West Branch drainage. This area totals approximately 45,433 acres, and is the size of multiple home ranges for even highly mobile species such as goshawks. The boundaries of the project area are drawn along natural topographic divisions, such as watersheds.

Table 3-16. Cumulative Effects Areas for Species Analyzed.

Species	Cumulative Effects Area
Canada lynx	Pelke and Upper West Branch Lynx Analysis Units
Grizzly bear	Area of habitat used outside of recovery area.
Black-backed woodpecker	Upper West Branch Drainage
Flammulated owl	Upper West Branch Drainage
Northern goshawk	Upper West Branch Drainage
Fisher	Upper West Branch Drainage
Pileated woodpecker	Upper West Branch Drainage
White-tailed deer	Winter Range Habitat in Upper West Branch Drainage

3.53c Analysis Indicators for Selected Species

Table 3-17 displays the issue indicators that are used to measure effects on selected wildlife species and their habitats. Indicators for each species may vary and are based on those factors that could result in measurable adverse or beneficial effects. For most species being analyzed, appropriate habitat parameters were measured to distinguish suitable habitat (specific parameters for individual species are located in the project file). The changes in suitable habitat for each relevant species are disclosed and a discussion of the effects on species is displayed in this section.

An important concept in discussing habitat suitability is the distinction between *capable habitat* and *suitable habitat*, and their counterparts of *unsuitable* and *not capable* habitats.

- *Capable* habitat - the inherent potential of a site to produce the necessary biotic and abiotic components to support a given species.
- *Suitable* habitat - 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 3-17. Issue indicators used to measure effects

Species	Indicator
Canada lynx	Acres of changes to key habitat components (denning, forage and unsuitable) Changes in winter recreational activities within LAUs.
Grizzly bear	Changes in open and total road densities and key habitats.
Black-backed woodpecker	Changes in distribution and quantity of snag habitat.
Flammulated owl	Changes in habitat suitability. Measured in acres and percent.
Northern goshawk	Trends in suitable nesting habitat and impacts to known nest sites. Measured in acres and percent.
Fisher	Changes to habitat suitability. Measured in acres and percent.
Pileated woodpecker	Changes to and availability of large snag habitat. Measured in acres and percent.
White-tailed deer	Changes to winter range habitat. Measured in acres and percent.
Forest land birds	Changes to priority habitats and vegetative diversity.

3.53d Canada Lynx

1. Methodology

Canada lynx habitat was evaluated using a habitat suitability model derived from data in the Idaho Panhandle National Forests' 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, lynx habitat is placed in the following broad categories:

- *Unsuitable*: Capable lynx habitat that has, through natural or artificial processes, lost vegetation of sufficient height to provide forage and cover for snowshoe hare populations through a winter of average snow depth.
- *High Quality Forage*: includes dense stands of regenerating conifers – both with (*early successional forage*) and without (*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 (greater than 70%) and enough coarse woody debris of structural complexity to provide denning opportunities for a female lynx rearing kittens.

- *Low Quality Forage*: habitats that are considered as suitable but do not have the characteristics that would make them suitable as denning habitat or high quality forage habitat. These stands may supply the occasional denning or foraging opportunity, or merely contribute forested habitat through which lynx can travel with a sense of security.

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

See figure H-12 in Appendix H for a map of the Pelke and Upper West Branch Lynx Analysis Units showing Habitat Conditions and Proposed Snowmobile Reroute.

2. Cumulative Effects Common to All Alternatives

The following list describes ongoing projects on National Forest lands within the Pelke and Upper West Branch lynx analysis units that could have the potential to influence lynx and lynx habitat. Design criteria have been included in Chapter II to avoid or minimize these potential effects.

- *Road Maintenance Activities*: This includes activities such as blading the road prism, brushing within eight feet along either side of the road prism, replacement and cleaning of culverts, and installing crushed rock on road surfaces.

- *Noxious Weed Control*: These activities include the chemical, mechanical and biological control of noxious weeds within the LAUs. Weeds that are treated are generally associated with the existing road prisms.

- *Spokane Winter Knights Snowmobile Warming Hut:* Existing special use permit for operating a warming hut located within the Pelke LAU at Section 5, T34N, R45E, near Mill Creek point, close to the western boundary of the project area. Snowmobile use associated with this facility is extensive due to adjacent snowmobile play areas.

- *Snowmobile trail grooming*: Annual grooming of 21.5 miles of snowmobile trails within the Pelke lynx analysis unit and 29.5 miles within the Upper West Branch lynx analysis unit. Trails are groomed approximately seven times between December through the end of March of each year.

- *Livestock grazing:* Two cattle grazing allotments overlap with both of these lynx analysis units. Approximately 4,104 acres are within the Upper West Branch LAU and 1,724 acres are within the Pelke LAU. These range allotments include the Lower Squaw Valley and the Upper Squaw Valley range allotments. The Lower Squaw Valley Allotment is currently inactive and the Upper Squaw allotment is in non-use status.

- *Public big game hunting and trapping:* Big game species and non-game species such as white-tail deer, mule deer, elk, moose and black bear, mountain lion and coyote are found throughout both of the lynx analysis units and are commonly hunted by publics from both Washington and Idaho. Trapping within these areas is commonly conducted by the public for such species as bobcat, pine marten, beaver and coyote. Potentially lynx can be taken during trapping activities targeted for bobcat because of the overlap in ranges between the two. However, the likelihood of this happening is rare because of the rarity of lynx and the limited amount of trapping for bobcat that is known to occur.

- *White Pine pruning:* Pruning of the lower limbs of white pine to reduce the incidence of blister rust. Approximately 130 acres have been completed within the Upper West Branch and Pelke LAUs and an additional 125 acres are planned for implementation in 2004 within the Pelke LAU.

- *Post harvest activities associated with the Flat-Moores Timber Sale and the Binarch Timber Sale:* An estimated 23 acres of excavator piling and burning, and 44 acres of underburning within the Flat Moores Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005. An estimated 22 acres of excavator piling and burning, and 56 acres of underburning within the Binarch Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005.

- *Trail maintenance activities:* Approximately 45 miles of recreational trail are located within the two lynx analysis units. Generally, trail maintenance activities have little impact on lynx, but heavy maintenance activities associated with trails within lynx denning habitat may result in an impact to lynx.

One reasonably foreseeable future activity on National Forest lands within the Pelke and Upper West Branch lynx analysis units that could have the potential to influence lynx and lynx habitat is:

- *Quartz-Cottonwood roads improvement:* This road improvement project proposes improvements to the existing road system within the Quartz Creek and Cottonwood Creek drainages. One proposed rock source would be a new rock pit development within the Upper West Branch lynx analysis unit. It is estimated that approximately 25 acres of timber would be removed and converted to a permanent rock pit. This activity will likely have an additional impact on lynx and lynx habitat within the Upper West Branch lynx analysis unit.

3. Alternative A – No Action

a. 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; 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 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 that are lost.

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 reasonable to assume that the area will experience wildfire at some point in the future. The magnitude of this fire would depend upon accessibility to the fire, available suppression 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.

Without the management activities proposed in the Chips Ahoy project, forest changes will continue, as described above. This will lead to increases in lynx denning habitat, and enhancement of existing denning habitat. Ongoing management and activities outlined above will continue their present levels of effects. The reasonably foreseeable development of a rock pit for the Quartz-Cottonwood road improvement work is likely to effect lynx and lynx habitat.

There would be no additional direct, indirect, or cumulative effects to lynx associated with this alternative.

4. Alternative B

a. Direct and Indirect Effects

This alternative would directly impact approximately 1,615 acres of identified lynx habitat. Approximately 836 acres of those proposed treatments would result in changes in habitat for lynx.

Denning habitat would decrease by 126 acres. Activities within proposed treatment units 6, 12, 19, 23, 46, 61, 71, and 73 would reduce overstory cover and reduce the amount of down wood material on the forest floor, which is important for lynx during the denning season. Proposed underburning would reduce high quality forage on 94 acres. The harvest and underburning would convert these areas into unsuitable habitat for approximately 15 years; depending upon winter snow depths, tree growth and overall tree stocking. After approximately 15 years, these areas would redevelop into high quality forage habitat.

Also, activities on 61 acres considered as low quality forage habitat would convert these areas into unsuitable habitat; however, after approximately 15 years it would potentially develop into suitable high quality forage habitat.

In addition to the timber harvest, the proposed action includes 0.7 miles of new road, which is part of a proposed rerouting of the groomed snowmobile trail system within the project area. Currently 7.5 miles of Roads 333 and 1108 are groomed to provide a connecting snowmobile loop. As part of the project proposal, grooming would be rerouted to Roads 2730 and 333B. The snowmobile reroute would increase the mileage of groomed snowmobile routes within the Pelke lynx analysis unit by 3.7 miles. This would increase associated impacts to high quality forage habitat by 48 acres (from 75 acres to 123 acres), but decrease impacts to denning habitat by 10 acres. Additionally, the reroute would eliminate snowmobiling within Consalus and Goose Creek drainage bottoms, which are important features for lynx to provide landscape connectivity and movement for lynx and other wildlife species.

b. Cumulative Effects

Upper West Branch Lynx Analysis Unit - Denning habitat would decrease by 42 acres, but the proportion of denning habitat within the LAU would not change measurably and would remain at 14 percent of the lynx analysis unit. High quality forage habitat would be reduced by 45 acres, which would not appreciably change the proportion of high quality forage within the lynx analysis unit from its current level of 18 percent. The amount of unsuitable habitat, which currently comprises 10 percent of the LAU, would be increased by 345 acres and increase the proportion of unsuitable habitat within the lynx analysis unit to 11 percent. The 345 acres increase in unsuitable habitat are the result of management activities within 257 acres of low quality forage habitat, 42 acres within denning habitat and 45 acres within high quality forage habitat. The amount of unsuitable habitat that has been created in the last decade, would increase to 3 percent of the LAU, but would remain well below the 15 percent upper threshold as established within the LCAS.

Table 3-18. Comparison between existing snowmobile route and the new proposed reroute.

Total Miles		Impacted Habitat – Acres				
		Denning	High Quality Forage	Low Quality Forage	Unsuitable	Total Acres
Old snowmobile route	7.5	89	75	59	14	238
New snowmobile route	11.2	79	123	118	18	339
Change from current	+3.7	-10	+48	+59	+4	+101

Within the Upper West Branch lynx analysis unit, the proposed action would not result in any of the proposed standards for habitat management being exceeded. Key attributes such as the proportion of denning and unsuitable habitat would remain within acceptable limits for the LAU. The proposed activity is not likely to adversely affect lynx or habitat within the Upper West Branch LAU.

Pelke Lynx Analysis Unit - Denning habitat would decrease by 84 acres, but the proportion of denning habitat within the LAU would not change measurably and would remain at 38 percent of the lynx analysis unit. High quality forage habitat would be reduced by 49 acres, which does not appreciably change the proportion of high quality forage within the lynx analysis unit from its current level of 24 percent of the LAU. The amount of unsuitable habitat, which comprises 9 percent of the LAU, would increase by 491 acres and increase the proportion of unsuitable habitat within the lynx analysis unit to 11 percent. The 491-acre increase in unsuitable habitat is the result of management activities within 359 acres of low quality forage habitat, 84 acres within denning habitat and 49 acres within high quality forage habitat. The amount of unsuitable habitat that has been created in the last decade, would increase to 4 percent of the LAU, but would remain well below the 15 percent upper threshold as established within the LCAS.

Within the Pelke lynx analysis unit, the proposed action would not result in standards for habitat management being exceeded. Key attributes, such as the proportion of denning and unsuitable habitat, would remain within acceptable limits for the LAU. The proposed activity is not likely to adversely affect lynx or its habitat within the Pelke LAU.

5. Alternative C

a. Direct and Indirect Effects

This alternative would directly impact approximately 1,615 acres of identified lynx habitat. About 836 acres of proposed treatments would result in habitat change for lynx. Denning habitat would decrease by 126 acres including units 6, 12, 19, 23, 46, 61, 71, and 73.

Activities within these units would reduce overstory cover and reduce the amount of down wood material on the forest floor, which is important for lynx during the denning season. Proposed underburning would reduce high quality forage on 94 acres. The harvest and underburning would convert these areas into unsuitable habitat for approximately 15 years until they evolve into high quality forage habitat. Also, activities on 61 acres of low quality forage habitat would be converted into unsuitable habitat as a result on management; however, after approximately 15 years it would develop into suitable high quality forage habitat for lynx.

b. Cumulative Effects

Upper West Branch Lynx Analysis Unit - Denning habitat would decrease by 42 acres, but the proportion of denning habitat within the LAU would not change measurably and would remain at 14 percent of the lynx analysis unit. High quality forage habitat would be reduced by 45 acres; this would not noticeably change the proportion of high quality forage within the lynx analysis unit from its current level of 18 percent of the LAU. The amount of unsuitable habitat, which comprises 10 percent of the LAU, would increase by 345 acres; thereby, increasing the proportion of unsuitable habitat within the lynx analysis unit to 11 percent. The amount of unsuitable habitat that has been created in the last decade would increase to 3 percent for the LAU, below the 15 percent upper threshold as established within the LCAS.

Within the Upper West Branch lynx analysis unit, the proposed action would not result in any of the proposed standards for habitat management being exceeded. Key attributes such as the proportion of denning and unsuitable habitat would remain within acceptable limits for the LAU. The proposed activity is not likely to adversely affect lynx or its habitat within the Upper West Branch lynx analysis unit.

Pelke Lynx Analysis Unit - Denning habitat would be decreased by 84 acres, but the proportion of denning habitat within the LAU would not change measurably and would remain at 38 percent of the lynx analysis unit. High quality forage habitat would be reduced by 49 acres; this would not noticeably change the proportion of high quality forage within the lynx analysis unit from its current level of 24 percent of the LAU. The amount of unsuitable habitat, which currently comprises 9 percent of the LAU, would increase by 491 acres; thereby, increasing the proportion of unsuitable habitat within the lynx analysis unit to 11 percent. The amount of unsuitable habitat that has been created in the last decade would increase to 4 percent of the LAU but would remain well below the 15 percent upper threshold as established within the LCAS.

Within the Pelke lynx analysis unit, the proposed action would not result in any of the proposed standards for habitat management being exceeded. Key attributes such as the proportion of denning and unsuitable habitat would remain within acceptable limits for the LAU. The proposed activity is not likely to adversely affect lynx or its habitat within the Pelke lynx analysis unit.

6. Alternative D

a. Direct and Indirect Effects

As a direct result of management, 836 acres of proposed treatments would result in habitat change for lynx. Denning habitat would decrease by 126 acres; this includes units 6, 12, 19, 23, 46, 61, 71, and 73. Activities within these units would reduce overstory cover and reduce the amount of down wood material on the forest floor, which is important for lynx during the denning season. Proposed underburning would reduce high quality forage on 94 acres. The harvest and underburning within these harvest areas would convert these areas into unsuitable habitat for lynx for approximately 15 years when these areas would redevelop into high quality forage habitat.

Also, activities on 61 acres considered as low quality forage habitat would convert these areas into unsuitable habitat; however, after approximately 15 years it would develop into suitable high quality forage habitat for lynx.

The snowmobile reroute would increase the mileage of groomed snowmobile routes within the Pelke lynx analysis unit by 3.7 miles -- an increase in impacts to high quality forage habitat by 48 acres (from 75 acres to 123), but decrease impacts to denning habitat. Additionally, the reroute would eliminate snowmobiling within Consalus and Goose Creek drainage bottoms, which are important as landscape feature for connectivity and movement for lynx and other wildlife species.

b. Cumulative Effects

Upper West Branch Lynx Analysis Unit - Denning habitat would be decreased by 42 acres, but would not change measurably and would remain at 14 percent of the lynx analysis unit. High quality forage habitat would be reduced by 45 acres; this would not result in appreciable change in the proportion of high quality forage within the lynx analysis unit from its current level of 18 percent of the LAU. The amount of unsuitable habitat, which comprises 10 percent of the LAU, would be increased by 345 acres and increase the proportion of unsuitable habitat within the lynx analysis unit to 11 percent. The amount of unsuitable habitat that has been created in the last decade would be increased to 3 percent of the lynx analysis unit but would remain well below the 15 percent upper threshold as established within the LCAS.

Within the Upper West Branch lynx analysis unit, the proposed action would not result in any of the proposed standard for habitat management being exceeded. Key attributes such as the proportion of denning and unsuitable habitat would remain within acceptable limits for the LAU. The proposed activity is not likely to adversely affect lynx or habitat for lynx within the Upper West Branch or the Pelke lynx analysis units.

7. Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan to manage the habitat of species listed under the Endangered Species Act (USDA Forest Service 1987, Forest Plan, p. II-6) and direction provided within the Lynx Conservation Assessment and Strategy.

3.53e Grizzly Bear

1. Methodology

Since the Chips Ahoy area is outside the designated grizzly bear recovery zone, there are presently no standards guiding control of motorized access or manipulation of habitat. However, because the northern end of the project area has a historic pattern of grizzly use, the emphasis is to manage this area for improved habitat conditions for bears. Specifically, motorized access will be controlled so that there will be no net increase in open or total drivable road densities as a result of proposed activities.

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 in the following discussion.

2. Cumulative Effects Common to All Alternatives

Several ongoing projects on National Forest lands within the analysis area for grizzly bears that could influence grizzly bears and habitat were considered. These include the following:

- *Road Maintenance Activities*: Includes activities such as blading the road prism, brushing within eight feet of either side of the road prism, replacement and cleaning of culverts, and installing crushed rock on road surfaces.
- *Noxious Weed Control*: These activities include the chemical, mechanical and biological control of noxious weeds within the LAUs. Weeds that are treated are generally associated with the existing road prisms
- *Special Use Permit for use of existing roads to access private lands* within Section 26, T60 N, R5W, B.M. (south of Bismark Mtn.); and Section 4 T.60N, R5W, B.M (in the Lamb Creek area).
- *Livestock grazing:* Two cattle grazing allotments overlap with both of these lynx analysis units. Approximately 4,104 acres are within the Upper West Branch LAU and 1,724 acres are within the Pelke LAU. These range allotments include the Lower Squaw Valley and the Upper Squaw Valley range allotments. The Lower Squaw Valley Allotment is currently inactive and the Upper Squaw allotment is in non-use status
- *Public big game hunting and trapping.* Big game species and non-game species such as white-tail deer, mule deer, elk, moose and black bear, mountain lion and coyote are found throughout both of the lynx analysis units and are commonly hunted by publics from both Washington and Idaho. Trapping within these areas is commonly conducted by the public for such species as bobcat, pine marten, beaver and coyote.
- *Post harvest activities associated with the Flat-Moores Timber Sale and the Binarch Timber Sale.* An estimated 23 acres of excavator piling and burning, and 44 acres of underburning within the Flat Moores Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005. An estimated 22 acres of excavator piling and burning, and 56 acres of underburning within the Binarch Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005.
- *Private and commercial use huckleberry picking.* Huckleberry picking is popular within the Priest lake drainage.
- *White Pine pruning*. The lower limbs of white pine are pruned to reduce the incidence of white pine blister rust. Approximately 130 acres have been completed within the Consalus Creek drainage and another 125 acres are planned for implementation in 2004.

3. Alternative A

a. Direct and Indirect Effects

Without access management, open road density in the occupied grizzly bear area would remain at its current high level of 3.4 miles per square mile. Artificial openings that are presently providing forage will close in as forest succession advances. Natural fire events would be the primary catalyst for creating early successional habitats for bears; however, because of current fire suppression policies, fire-created habitats such as shrub fields would likely become less predominant on the landscape.

4. Alternative B

a. Direct and Indirect Effects

Grizzly bears would likely be displaced during implementation of the proposed management activities. Management activities that would impact grizzly bears would include timber harvest, road maintenance, road construction, and road decommissioning. Proposed management would enhance grizzly bear foraging habitat on approximately 792 acres. Management actions that would open the canopy, along with subsequent underburning, would stimulate the shrub component. Ecosystem burning on 32 acres of dry site habitat is anticipated to enhance forage species used by grizzly bears during the spring and summer seasons.

Open road miles would be reduced by 9.75 miles within the project area. A total of 85 miles of road maintenance would increase the amount of drivable roads by 7 miles and result in a change in open road density. The remaining 78 miles of road maintenance would not change the amount of drivable road miles, as these roads are currently open and drivable by motorized vehicles. New construction of 2.5 miles of temporary road and 0.75 miles of system road would also increase open road miles, but would be partiality mitigated by closure of the 2.5 miles of temporary road following timber harvest within those areas. Decommissioning and storage of 35 miles of road would reduce open drivable roads by 17 miles. The remaining 18 miles of road decommissioning would not change the total open road mileage, as these roads are currently undriveable.

b. Cumulative Effects

The proposed harvest and road treatments will likely result in the displacement of bears from the vicinity of the project area during implementation. The reduction in drivable road miles would reduce total open road density from 511 miles to 501 miles, reducing the total road density from 3.4 miles/miles^2 to 3.34 miles/miles^2. This would result in the slight reduction in the risk of mortality for grizzly bears. This alternative is not likely to adversely affect grizzly bears or habitat for grizzly bears.

5. Alternative C

a. Direct and Indirect Effects

Grizzly bears would likely be displaced during implementation of this alternative. Similar to Alternative B, this alternative would treat 1,680 acres of habitat within the project area. The 792 acres of underburning and 32 acres of ecosystem burns are anticipated to enhance forage species used by grizzly bears during the spring and summer seasons.

This alternative would result in a net reduction in drivable road miles of 10 miles. A total of 85 miles of road maintenance would increase open road miles by 7 miles, as the remaining 78 miles proposed for maintenance are currently open and drivable. The decommissioning and storage of 35 miles of road would reduce open drivable roads by 17 miles. The other 18 miles of road decommissioning would not impact the total open road mileage as these roads are currently undriveable.

b. Cumulative Effects

The proposed harvest and road treatments will likely result in the displacement of bears from the vicinity of the project area during implementation. The reduction in drivable road miles would reduce total open road density from 511 miles to 501 miles, resulting in the total road density being reduced from 3.4 miles/miles^2 to 3.32 miles/miles^2. This would result in the slight reduction in the risk of mortality for grizzly bears. This alternative is not likely to adversely affect grizzly bears or habitat for grizzly bears.

6. Alternative D

a. Direct and Indirect Effects

Grizzly bears would likely be displaced during implementation of this alternative. This alternative would treat 840 acres of habitat within the project area. The 92 acres of underburning and 32 acres of ecosystem burns are anticipated to enhance forage species used by grizzly bears during the spring and summer seasons.

This alternative would result in a net reduction in drivable road miles of approximately 16.25 miles. New construction on 0.3 miles of temporary road and 0.75 miles of system road would increase open road miles, but would be partiality mitigated by closure of the temporary roads following timber harvest within those areas. The decommissioning and storage of 35 miles of road would reduce open drivable roads by 17 miles. The other 18 miles of road decommissioning would not impact the total open road mileage, as these roads are currently undriveable.

b. Cumulative Effects

The proposed harvest and road treatments will likely result in the displacement of bears from the vicinity of the project area during implementation. The reduction in drivable road miles would reduce total open road density from 511 miles to 495 miles resulting in the total road density being reduced from 3.4 miles/miles^2 to 3.27 miles/miles^2. This would result in the slight reduction in the risk of mortality for grizzly bears. This alternative is not likely to adversely affect grizzly bears or habitat for grizzly bears.

7. Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed under the Endangered Species Act (USDA 1987, p. II-6).

3.53f Black-backed woodpeckers

1. Methodology

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

2. Effects Common to All Alternatives

a. Direct and Indirect Effects

Project design features (Chapter II) would retain snag and snag replacement habitat within all harvested areas at levels that support cavity nesting species, including black-backed woodpeckers. 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.

b. Cumulative Effects

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.

Ongoing projects on National Forest lands within the Upper West Branch drainage that may impact black-backed woodpecker and habitat also were considered. These include the following:

- *Road Maintenance Activities*: This includes activities such as blading of the road prism, brushing within eight feet of either side of the road prism, replacement and cleaning of culverts, and installing of crushed road on road. Snags adjacent to open roads that present a danger to public safety are often removed.
- *Firewood cutting:* 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.

3. Alternative A

a. 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 under 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 closely associated with post-fire habitats, their populations would likely 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.

b. Cumulative Effects

While Alternative A would not alter existing snag habitat through mechanical means, the abnormal levels of fuels from years of past fire suppression have altered historic fire regimes, resulting in possible catastrophic losses of potential habitat from insects, disease or wildfire. Consequently, Alternative A 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.

4. Alternative B and C

a. Direct and Indirect Effects

Timber harvesting would occur on approximately 1,678 acres that contain some form of snag habitat. In the long-term (more than 80 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 areas that are 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 and to a lesser extent grand fir, 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 on 792 acres is expected to kill a portion of the residual green trees, creating additional habitat for black-backed woodpeckers.

Approximately 32 acres of ecosystem burning would likely create a flush of snag habitat as fire killed trees would be created in all size classes to the benefit of 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 Chips Ahoy project area would remain unaffected by past and proposed cutting. Areas outside proposed treatment areas would continue to be susceptible to insect and disease, thereby perpetuating small to medium-sized snag habitat for black-backed woodpeckers.

Consequently, Alternatives B and C 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.

5. Alternative D

Direct and Indirect Effects

Tree cutting would occur on approximately 834 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 proposed units, tree mortality in lower risk stands would continue to advance, producing higher quality snags.

Approximately 32 acres of ecosystem burning would likely create a flush of snag habitat as fire killed trees would be created in all size classes to the benefit of black-backed woodpeckers. Consequently, this alternative 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 this alternative, black-backed woodpecker populations would remain at reduced densities and their current distribution would be sustained.

6. 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, Forest Plan 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 greater than 20 inches dbh, 82 snags greater than 12 inches dbh, and 45 snags greater than 10 inches dbh, per 100 acres or 1.35 snags per acre. Design features for this project call for retaining at least 4 snags per acre from the largest representative size class on dry habitats, and at least 6 snags per acre 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).

3.53g Flammulated Owl

1. 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 following field walk-through exams (see dry-site stand condition field notes, Wildlife section of the 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.

2. Effects Common to All Alternatives

a. Direct and Indirect Effects

Proposed harvest units 61 and 65 are the only timber harvest activities that will occur within suitable habitat for flammulated owls. Management activities within these units are designed to maintain the current level of habitat suitability. Within capable habitat, management activities will generally be designed to hasten the development of the habitat into a suitable condition for flammulated owls.

Snag habitat management guidelines would ensure that the appropriate number and types of snag habitat are retained within each timber harvest area. This would work to ensure that the nesting structure, which is an important component for this species, is available.

b. Cumulative Effects

There are several ongoing projects on National Forest lands within the Upper West Branch drainage. These activities may impact flammulated owls, but in themselves are not likely to result in the need for federal listing as an endangered or threatened species. They include the following:

- *Noxious Weed Control*: These activities include the chemical, mechanical and biological control of noxious weeds within flammulated owl habitat. Weeds that are treated are generally associated with the existing road prisms.
- *Livestock grazing:* Two cattle grazing allotments overlap with flammulated owl habitat within the Upper West Branch drainage -- the Lower Squaw Valley and the Upper Squaw Valley range allotments. The Lower Squaw Valley Allotment is currently inactive and the Upper Squaw allotment is in non-use status
- *Post harvest activities associated with the Flat-Moores Timber Sale and the Binarch Timber Sale.* An estimated 23 acres of excavator piling and burning, and 44 acres of underburning within the Flat Moores Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005. An estimated 22 acres of excavator piling and burning, and 56 acres of underburning within the Binarch Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005.

3. Alternative A

a. Direct and Indirect Effects

While Alternative A would not alter existing vegetation patterns through mechanical means; within some areas, 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. Consequently, habitat suitability for flammulated owls would decline within some areas. Within other areas, natural development and disturbance would trend some younger stands or habitats towards conditions that would be suitable for flammulated owls.

b. Cumulative Effects

Cumulatively, Alternative A would not have additional impacts to flammulated owls because it does not propose any actions or activities that would alter habitat conditions; however it would result in the changes described as direct and indirect effects.

4. Alternatives B and C

a. Direct and Indirect Effects

Alternative B proposes treating approximately 732 acres of capable flammulated owl habitat. This would affect approximately 8 percent of the capable habitat within the cumulative effects area, including some 62 acres of suitable habitat.

Approximately 595 acres of capable habitat would be treated using non-regeneration type harvest methods, which includes 62 acres of suitable habitat. These treatment would remove trees in areas where there is the opportunity to maintain or enhance the growth of ponderosa pine, moving the stands toward desired structural stages. Trees to be 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 are not currently suitable due to a dense secondary canopy layer that limits foraging opportunities, yet contain a primary canopy layer of mature ponderosa pine/Douglas-fir. These stands would be directly converted to suitable flammulated owl habitat through selective harvest of a portion of the secondary canopy layer. Approximately 255 acres fall into this category. The remaining 278 acres of non-regeneration harvest within capable flammulated owl is anticipated to enhance the development of future suitable flammulated owl habitat more quickly than would occur without management.

Alternatives B and C also propose treating 137 acres with regeneration harvest prescriptions within flammulated owl capable habitat. Stands with regeneration prescriptions are generally stands with a high component of Douglas-fir that are at high risk of mortality. Because of the high mortality of Douglas-fir, 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.

b. Cumulative Effects

Cumulatively, Alternatives B and C would initially increase flammulated owl habitat within the Upper West Branch drainage by 255 acres, thus increasing the proportion of suitable habitat from 2.7 percent to 5.4 percent. Management activities such as improvement cuts and salvage on an additional 278 acres would increase the proportion of suitable habitat within the drainage from 5.4 percent to 8.4 percent. However, this later increase in suitable habitat would not likely occur for a few decades until the effects of management have occurred and habitat matures into suitable condition.

5. Alternative D

a. Direct and Indirect Effects

Alternative D proposes treating approximately 304 acres of capable flammulated owl habitat. This would affect approximately 3 percent of the capable habitat within the cumulative effects area, including some 58 acres of suitable habitat.

The capable habitat to be treated, which includes 58 acres of suitable habitat, would utilize non-regeneration type harvest methods. This treatment 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 are not currently suitable due to a dense secondary canopy layer that limits foraging opportunities, yet contain a primary canopy layer of mature ponderosa pine/Douglas-fir. These stands would be directly converted to suitable flammulated owl habitat through selective harvest of a portion of the secondary canopy layer. Approximately 180 acres would fall into this category. The remaining 67 acres of non-regeneration harvest within capable flammulated owl habitat is anticipated to enhance the development of future suitable flammulated owl habitat.

b. Cumulative Effects

Cumulatively, Alternative D would initially increase flammulated owl habitat within the Upper West Branch drainage by 180 acres, thus increasing the proportion of suitable habitat from 2.7 percent to 4.6 percent. Management activities such as improvement cuts and salvage on an additional 67 acres would increase the proportion of suitable habitat within the drainage from 4.6 percent to 5.3 percent. Although this later increase in suitable habitat would not likely occur for a few decades until the effects of management have occurred and habitat matures into suitable condition.

6. Conclusion

In reversing the general trend of understory congestion and increased fire risk in dry-site stands, Alternatives B, C, and D would enhance flammulated owl habitat in the long term. In the short term, there would be no decrease in suitable habitat acres. Treatments would allow flammulated owls to maintain their same general distribution, thus maintaining species viability. Therefore, Alternative B, C, or D would provide a beneficial effect to flammulated owls.

7. Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act (USDA. 1987, p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

3.53h Northern Goshawk

1. 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 micro-sites, 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 TSMRS stand boundaries, but are delineated by combining the stand layer with DEM data at 2-meter resolution.

While the model may be an adequate broad predictor of habitat suitability; field verification of a limited number of stands, within the project area, identified by the model as "suitable" has shown much of these stands to contain an understory that is too dense 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 and potential impacts to known nest sites that would result from each alternative.

2. Effects Common To all Alternatives

a. Direct and Indirect Effects

No impacts would occur to goshawk nest sites because project design features would protect all known or discovered goshawk nest sites by establishing a 30-acre buffer around nest sites. Additionally, no disruption of active nests would occur because management activities would not occur within the post fledgling area (420 acres area centered around the active nest site) between March 15th and August 15th.

b. Cumulative Effects

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. Regeneration harvest generally eliminates stands from consideration as suitable nesting habitat, although foraging opportunities would remain to some extent.

Several ongoing projects on National Forest lands within the Upper West Branch analysis area that could impact northern goshawks and associated habitat also were considered. These include the following:

- *Road Maintenance Activities*: This includes activities such as blading the road prism, brushing within eight feet of either side of the road prism, replacement and cleaning of culverts, and installing crushed rock on road surfaces.
- *Noxious Weed Control*: These activities include the chemical, mechanical and biological control of noxious weeds within the Upper West Branch drainage. Weeds that are treated are generally associated with the existing road prisms.
- *Post harvest activities associated with the Flat-Moores Timber Sale and the Binarch Timber Sale.* An estimated 23 acres of excavator piling and burning, and 44 acres of underburning within the Flat Moores Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005. An estimated 22 acres of excavator piling and burning, and 56 acres of underburning within the Binarch Timber Sale area are schedule to be accomplished in fiscal years 2004 and 2005.

3. Alternative A

a. 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. 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 are affected by stand-replacing fire or not, the proportion of suitable goshawk nesting habitat would change over time.

b. Cumulative Effects

Cumulatively, Alternative A would not result in any additional impacts to nesting habitat for northern goshawks or any known nest sites because it does not propose any actions or activities that would alter habitat conditions. The quantity, quality and distribution of suitable nesting habitat will continue to change over time as natural disturbances and stand development influence capable habitat for this species.

4. Alternative B and C

a. Direct and Indirect Effects

Alternative B and C would treat approximately 936 acres of capable habitat, 99 acres of which are modeled as currently suitable. Approximately 153 acres of the capable habitat within proposed units will be treated by selective harvest, which includes commercial thinning or improvement cutting. Selective cutting would sustain forest structure that is compatible with suitable goshawk nesting habitat, or in some cases would facilitate the development of suitable nesting structure by removing understory congestion.

Approximately 576 acres of capable habitat will be treated by regeneration harvest, including 67 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.

Proposed activities would harvest approximately 40 acres within the Blonc Creek Post Fledgling Area (PPA). Proposed harvest units 26, 27, 28 and 29 would be within the post-fledgling protection area. This proposed harvest would increase the amount of early successional within the PPA from 42 acres to 82 acres which is within the recommendations by Reynolds et al. (Reynolds and Linkhart 1992). The proposed harvesting would be seed-tree regeneration units that would likely serve as foraging areas for goshawks.

b. Cumulative Effects

Most of the 212 capable acres treated by selective harvest with alternatives B and C should move into suitable habitat condition over time. At the same time, as many as 67 acres of currently suitable habitat will be converted to unsuitable condition by regeneration harvest. While regeneration treatments in this alternative may delay 576 acres of capable habitat from reaching suitability, there is no guarantee that all of these acres would achieve suitable condition if the No Action Alternative were selected.

Implementation of Alternative B or C would reduce the amount of suitable nesting habitat within the Upper West Branch by 67 acres. Proportionally the amount of suitable nesting habitat would not change but would remain at 22 percent of the drainage.

5. Alternative D

a. Direct and Indirect Effects

Alternative D would treat approximately 517 acres of capable goshawk habitat, 63 acres of which are modeled as currently suitable. There would be no reduction in the amount of suitable habitat because timber harvest prescriptions within suitable habitat consist primarily of improvement cutting and salvage harvest. Similar to Alternatives B and C, approximately 153 acres of the capable habitat within proposed units will be treated by selective harvest, which includes commercial thinning or improvement cutting. Selective cutting would sustain forest structure that is compatible with suitable goshawk nesting habitat, or in some cases would facilitate the development of suitable nesting structure by removing understory congestion.

b. Cumulative Effects

Most of the 153 capable acres treated by selective harvest in this alternative should move into suitable habitat condition over time. No reductions in the amount of suitable habitat would occur, thus the proportion of suitable habitat within the Upper West Drainage would remain unchanged.

6. Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act (USDA 1987 p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

3.53i Fisher

1. 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 be found in the project file. Fisher and marten habitats are 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 stands, which are relatively open and 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.

2. Cumulative Effects Common to All Alternatives

Regional snag protocols would guarantee adequate snag and snag recruitment density, which would provide for future recruitment of course woody debris within proposed treatment areas. Regeneration harvest generally eliminates stands from suitable denning condition, although foraging opportunities would remain to some extent.

Several ongoing projects on National Forest lands within the Upper West Branch analysis area that could impact fishers and fisher habitat also were considered. These include the following:

- *Road Maintenance Activities*: This includes activities such as blading the road prism, brushing within eight feet of either side of the road prism, replacement and cleaning of culverts, and installing crushed rock on road surfaces.
- *Noxious Weed Control*: These activities include the chemical, mechanical and biological control of noxious weeds within the Upper West Branch drainage. Weeds that are treated are generally associated with the existing road prisms.
- *Spokane Winter Knights Snowmobile Warming Hut:* This existing special use permit for the operating and use of a warming hut located within the Upper West Branch drainage at T45N, R35E, Section 5, near Mill Creek point on the western edge of the project area. Snowmobile use associated with this facility is extensive because of the large snowmobile play areas.
- *Snowmobile trail grooming*: Grooming of 30 miles of snowmobile trails within the Upper West Branch drainage unit occur on an annual basis. Trails are groomed approximately seven times between December and the end of March of each year.

- *Livestock grazing:* Two cattle grazing allotments overlap with both of these lynx analysis units. Approximately 4,104 acres are within the Upper West Branch LAU and 1,724 acres are within the Pelke LAU. These range allotments include the Lower Squaw Valley and the Upper Squaw Valley range allotments. The Lower Squaw Valley Allotment is currently inactive and the Upper Squaw allotment is in non-use status.

- *Public big game hunting and trapping.* Big game species and non-game species such as white-tailed deer, mule deer, elk, moose, black bear, mountain lion and coyote are found throughout the Upper West Branch Drainage and are commonly hunted by people from Washington and Idaho. Trapping within these areas is common for such species as bobcat, pine marten, beaver and coyote. Potentially, fisher can be taken during trapping activities targeted for marten because of the overlap in ranges and trapping technique between the two. Although the likelihood of this happening is rare because of the rarity of fisher and the limited amount of trapping for marten that is known to occur.

3. Alternative A

a. 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 under an action alternative would. However, with the No Action Alternative 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.

b. Cumulative Effects

Cumulatively, Alternative A would have any additional impacts to fisher because it does not propose any actions or activities that would alter habitat conditions; however it would result in the changes described as direct and indirect effects.

4. Alternatives B and C

a. Direct and Indirect Effects

Alternatives B and C would treat approximately 1,562 acres of capable fisher habitat, 200 acres of which are currently suitable for fishers and the remaining 1,362 acres are unsuitable. Within the unsuitable habitat, 304 acres of the harvest are not anticipated to impact development of fisher habitat because required habitat components such as tree density, overstory cover and down logs would be retained. Suitable fisher habitat can be maintained through selective harvesting under prescriptions that maintain at least 50 percent overstory canopy cover. Proposed timber harvest treatments such as shelterwood and seed tree within suitable fisher habitat would reduce the amount of suitable habitat by 148 acres. Improvement cutting and salvage on 52 acres within suitable habitat is anticipated to retain the current level of habitat suitability.

b. Cumulative Effects

Alternatives B and C would reduce the amount of suitable habitat within the Upper West Branch drainage by 148 acres (see figure H-16 in Appendix H). This would result in the proportion of suitable habitat being reduced from the current level of 26 percent to 25 percent of the drainage. Additionally, proposed management activities on 1,258 acres of capable habitat, which is not currently in a suitable condition, would deter stand development into suitable habitat. However, capable habitat conditions for fisher and flammulated owls overlap to some degree. Thus, 533 acres of the 1,258 acres are targeted for management to enhance habitat for flammulated owls (see flammulated owl discussion for detailed information.) By favoring habitat management for flammulated owls within these "overlap" areas, conditions for suitable nesting for flammulated owls could be improved. Although suitable denning habitat for fishers would likely not be attained because of the more open conditon which is required by the owls, the habitat would likely retain some level of use by fishers as hunting or foraging habitat.

5. Alternative D

a. Direct and Indirect Effects

Alternative D would treat approximately 782 acres of capable fisher habitat, 58 acres of which are currently suitable for fishers and the remaining 724 acres are unsuitable. Within the unsuitable habitat, 304 acres of commerical thinning and salvage harvest are not anticipated to impact habitat development. Suitable fisher habitat can be maintained through selective harvesting under prescriptions that would maintain at least 50 percent overstory canopy cover.

This alternative proposes shelterwood harvest treatments within suitable fisher habitat and would reduce the amount of suitable habitat by 6 acres. Improvement cutting and salvage harvesting within suitable habitat on 52 acres is anticipated to retain the current level of habitat suitability.

b. Cumulative Effects

Alternative D would reduce the amount of suitable habitat within the Upper West Branch drainage by 58 acres. This would not reduce the portion of suitable habitat from the current level of 26 percent of the drainage. Additionally, proposed management activities on 6 acres of capable habitat which is not currently suitable would deter stand development into suitable habitat. Although this 6 acres of this is targeted for management to enhance habitat for flammulated owls within the project area, due to the overlap of capable habitat conditions for flammulated owls and fishers. By favoring habitat management for flammulated owls with these "overlap" areas, conditions for suitable nesting for flammulated owls could be improved. Although suitable denning habitat for fishers would likely not be attained because of the more open conditon which is required by the owls, the habitat would likely retain some level of use by fishers as fhunting or foraging habitat.

6. 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 Lynx Conservation Assessment and Strategy 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. INFS guidelines and BMPs will assure that riparian habitats important to fishers will be retained. Consequently, Alternatives B, C, and D 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.

7. Consistency with Forest Plan and Other Regulations

All action alternatives are consistent with the Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act (USDA 1987, p. II-28). Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

3.53j Pileated Woodpecker

1. 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 be found in the Wildlife section of 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 Wildlife 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.

2. Cumulative Effects Common to All Alternatives

Several ongoing projects on National Forest lands within the Upper West Branch drainage that could affect pileated woodpeckers and habitat for this species were also considered. They include the following:

- *Road Maintenance Activities*: This includes activities such as blading the road prism, brushing within eight feet of either side of the road prism, replacement and cleaning of culverts, and installing crushed rock on road surfaces. Snags adjacent to open roads that present a danger to public safety are often removed. Although the utility of large snags adjacent to open roads for pileated woodpecker nesting habitat is unknown, it can be assumed that road maintenance activity would likely have little impact on this species.

- *Firewood cutting:* 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.

3. Alternative A

a. 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 Chips Ahoy 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.

b. Cumulative Effects

Cumulatively, Alternative A would not have any additional impact to pileated woodpeckers because it does not propose any actions or activities that would alter habitat conditions; however, the changes described above in direct and indirect effects would occur.

4. Alternatives B and C

a. Direct and Indirect Effects

These alternatives propose timber harvest on 1,678 acres of capable pileated woodpecker nesting habitat, of which 598 acres are currently in a suitable condition. Most of the capable habitat that is currently unsuitable and is proposed for treatment has considerable tree mortality. If left untreated, it is unlikely these stands would reach late successional forest structure in the near future because of the dominance of Douglas-fir and the mortality that is occurring and is predicted to occur. Given that these stands are unlikely to provide nesting for pileated woodpeckers in the near future, treatment would accelerate the trend of these stands toward suitable habitat for this species. Accordingly, proposed treatments within these areas would have a minor immediate effect on pileated woodpecker habitat.

Design features which would require leaving the appropriate number of snags and snag replacement trees per acres within timber harvest units would retain feeding habitat capabilities for pileated woodpeckers, although nesting habitat values and capability would be lost. The proposed 546 acres of regeneration vegetation treatments would, over the long-term (about 80-100 years), 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 on 1,092 acres would favor the desired tree species and trend these stands to an older size class and promote larger size snags. Of these acres, 208 acres are presently characterized as mature stands.

Treatment of dry sites to remove competing understory trees so 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. These preferable conditions are often the scenario in today's dry sites because the current density has resulted from fewer understory burns, while the existing large snags resulted from earlier conditions of 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 as trees die and the snags fall to the forest floor. 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.

b. Cumulative Effects

Implementation of either Alternative B or C would result in a reduction of 598 acres in suitable nesting habitat for pileated woodpecker. The proportion of suitable nesting habitat would be reduced from 42 percent, the current level, to 40 percent. The implementation of regional snag management guidelines (Chapter II Design Criteria) would ensure that there would be no long-term decrease in suitable pileated woodpecker nesting habitat from these activities. The reduction in open road miles would also reduce the effects of firewood cutting of snag habitat, especially snag habitat which is in close proximity of roads, thus enhancing habitat for this species. Consequently, either Alternative B or C 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.

5. Alternative D

a. Direct and Indirect Effects

This alternative would propose timber harvest on 825 acres of capable pileated woodpecker nesting habitat, of which 193 acres are currently in a suitable condition. Proposed management activities within suitable nesting habitat would retain suitable conditions for pileated woodpeckers. Design features which would require leaving the appropriate number of snags and snag replacement trees per acres within timber harvest units would retain feeding habitat capabilities for pileated woodpeckers, although nesting habitat values and capability would be lost.

b. Cumulative Effects

Implementation of this alternative would result in a reduction of 193 acres in suitable nesting habitat for pileated woodpecker. The proportion of suitable nesting habitat would be reduced from 42 percent, the current level, to 41 percent. The implementation of regional snag management guidelines (Chapter II Design Criteria) would ensure that there would be no long-term decrease in suitable pileated woodpecker nesting habitat from these activities. The reduction in open road miles would also reduce the effects of firewood cutting of snag habitat, especially snag habitat that is in close proximity of roads, thus enhancing habitat for this species. Consequently, This alternative 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.

6. Conclusion

The proposed project incorporates design features that maintain minimum numbers of snags within the harvest units (see Chapter II for more information). In addition to this, numerous snags being created outside of the proposed units would not be treated. This is true over the entire Idaho

Panhandle National Forests 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 B, C, and D 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.

7. 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, Forest Plan Appendix X). While some tree cutting would occur within designated old growth in the Chips Ahoy 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).

3.53k White-tailed Deer

1. Methodology

White-tailed deer 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.

2. Cumulative Effect Common to All Alternatives

Several ongoing projects on National Forest lands within big game winter range habitats within the analysis area. They include the following:

- *Road Maintenance Activities*: These activities include activities such as blading the road prism, brushing within eight feet of either side of the road prism, replacement and cleaning of culverts, and installing crushed grave on the road surface.
- *Snowmobile trail grooming*: Grooming of 30 miles of snowmobile trails within the Upper West Branch drainage unit occur on an annual basis. Trails are groomed approximately seven times from December through March of each year.
- *Noxious Weed Control*: These activities include the chemical, mechanical and biological control of noxious weeds within the Upper West Branch drainage. Weeds that are treated are generally associated with the existing road prisms.

- *Livestock grazing:* The Lower Squaw Valley grazing allotment overlaps with areas that have been identified as big game winter range. Competition between livestock and big game for available forage likely exists but has not been identified as negatively impacting big game populations or habitat. The Lower Squaw Valley Allotment is currently inactive.

3. Alternative A

This alternative would have no additional impact on white-tailed deer and big game winter range habitat. Early successional habitats within the winter range would continue to mature from the existing forage condition to cover.

4. Alternatives B and C

a. Direct and Indirect Effects

These alternatives would harvest approximately 312 acres identified as big game winter range within the project area. Improvement cutting would occur on three harvest units totaling 154 acres, salvage harvest would occur on three units totaling 147 acres, thinning would occur on one harvest area of five acres. Proposed timber harvest unit 64, which is 6 acres, would reduce current thermal cover capabilities within that unit. There would be no disturbance to deer within the winter range as a result of the proposed alternatives, as activities would not be conducted during the winter period.

b. Cumulative Effects

Alternatives B and C would not contribute measurably to any cumulative impacts on white-tailed winter range conditions within the Dickensheet area.

5. Alternative D

a. Direct and Indirect Effects

This alternative would harvest approximately 306 acres identified as big game winter range within the project area. Similar to Alternatives B and C, this alternative would include improvement cutting within three harvest units totaling 154 acres, salvage harvest on three units totaling 147 acres, and commercial thinning on one harvest area of five acres. No reduction in the proportion of quality cover would occur as a result of implementation of this alternative. There would be no disturbance to deer within the area, as activities would not be conducted during the winter.

b. Cumulative Effects

Alternative D would not contribute measurably to any cumulative impacts on white-tailed winter range conditions within the Dickensheet area

6. 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.

3.53l Forest Land Birds

1. Methodology

Species of forest land birds 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 (Idaho Partners in Flight 2000) and discusses how management activities, or even a lack of management activities, can affect bird species composition and richness.

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 Chips Ahoy project area. Currently the long-term viability of the dry ponderosa pine/Douglas-fir habitats is at risk. According to Idaho Partners in Flight (Idaho Partners in Flight 2000), 31 species of Idaho's breeding species use this habitat for nesting.

2. Alternative A

a. Direct and Indirect Effects

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 of this EIS, 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.

3. Alternatives B, C and D

a. Direct and Indirect Effects

Priority habitats (riparian habitat and dry ponderosa pine/Douglas-fir/grand fir forests) 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 (see Design Criteria and Mitigation section in Chapter II). 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.

4. 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.

5. Cumulative Effects Common to Alternatives B, C, and D

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.

6. Consistency with Forest Plan and Other Regulations

While the Forest Plan does not address specific standards for managing forest land birds, it does provide guidance for managing snag habitat and old growth. This project would exceed Forest Plan Standards for snag management and would not adversely impact inventoried old growth stands. Therefore, these actions would also be consistent with the National Forest Management Act requirements for population viability (CFR 219.19).

3.6 Soils

3.61 Regulatory Framework

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

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

The Multiple Use-Sustained Yield Act of 1960 directs the Forest Service to achieve and maintain outputs of various renewable resources in perpetuity without permanent impairment of the land's productivity. Section 6 of the NFMA charges the Secretary of Agriculture with ensuring research and continuous monitoring of each management system to safeguard the land's productivity. The Code of Federal Regulations for Forest Planning requires the Forest Service to measure effects of prescriptions, including "significant changes in land productivity" (Code of Federal Regulations 36 CFR Part 200, Section 1, 1987).

To comply with requirements, the Chief of the Forest Service charged each Forest Service Region to develop soil quality standards for detecting soil disturbances indicating a loss in long-term productive potential. These standards and guidelines are built into Forest Plans.

Direction in the IPNF Forest Plan (p. II-17) is to manage the soil resource to maintain long-term productivity. The objective is that management activities on forest lands will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. Forest Plan standards (pp. II-32 and 33) include:

(1) Soil-disturbing management practices will strive to maintain at least 80 percent of the activity area in a condition of acceptable productivity potential for trees and other managed vegetation. Unacceptable productivity potential exists when soil has been detrimentally compacted, displaced, puddled, or severely burned as determined in the project analysis.

(2) Projects should strive to maintain sufficient large woody debris to maintain site productivity;

(3) In the event of whole tree yarding, provisions for maintenance of sufficient nutrient capital should be made in the project analysis.

The Regional Soil Quality standards were revised in November 1999. As included in Forest Plan Standard (1) as discussed above, detrimental soil disturbance includes the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. The revised standard specifies that 85 percent of an activity area (i.e. cutting unit) must have soil that is in satisfactory condition. In areas where more than 15 percent detrimental soil conditions exists from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality.

These standards do not apply to intensively developed sites such as mines, developed recreation sites, administrative sites, and permanent roads or landings. These standards are based on the lowest magnitude of adverse change detectable, given the current monitoring technology (Powers 1990).

3.62 Affected Environment

3.62a Methodology

The reference and current conditions of the soils in the project area were determined using landtype maps and landtype unit descriptions, information from the Priest River Subbasin Geographic Assessment (USDA draft in progress), data from the Timber Stand Management Record System (TSMRS) and field surveys.

A more detailed description of the geomorphology, soils, erosion processes and soil productivity can be found in the draft soil map unit descriptions and a soil characterization for the Upper West Branch portion of the Priest River subbasin (USDA draft in progress). These documents are included in the project file.

A systematic procedure was established to identify the existing condition of each stand proposed for treatment as it relates to soil quality standards. This procedure evaluated whether soils are at risk of not meeting standards due to being detrimentally disturbed or having low potassium content. Records of past activities were queried from the TSMRS database, and stands were field reviewed to determine whether soils have been detrimentally disturbed. A map of proposed project units was compared with a map of geologic formations to determine which units occurred on the low potassium geologic formations. This information is located in the project file. Potential for mass failure and sediment delivery to streams is addressed in the Watershed section of this chapter.

3.62b Reference Conditions

1. Soil Productivity

Soil productivity is the output of a specified plant or group of plants under a defined set of management practices, or total plant mass produced annually per unit area. The most productive part of the soil in the project area occurs near the surface at the contact between the forest litter and the mineral soil. Here the litter has been highly decomposed into dark colored amorphous material, which is the richest part of the soil. This layer is frequently only a few inches thick, but its presence is much more important than its thickness would indicate. This organic matter rich layer contains most of the soil nitrogen, potassium and mycorrhizae, which must be present for a site to be productive.

Below this organic horizon is volcanic ash, which occurs as the surface layer of the mineral soil. In north Idaho, the ash layer is typically 16 inches thick, ranging between 7 and 24 inches on most sites. The top part of the ash is usually enriched in organic matter, which also contributes nitrogen, potassium and mycorrhizae to this part of the soil. The lower part of the volcanic ash has less organic matter and is not as fertile as the upper part. The ash has a high water holding capacity and nutrient holding capacity, both of which are important for soil productivity.

Below the volcanic ash, the subsoils and substratum tend to be medium textured in the Belt Metasedimentary soils. These subsoil and substratum materials are very weakly weathered. They tend to have a high component of rock fragments, although this can be quite variable, particularly in the alluvial bottoms.

Most of the productivity of all project area soils is found near the soil surface. This is also the part of the soil that is most easily disturbed by management activities. Retaining large woody debris and organic matter is important to maintaining this productive layer (Graham et al. 1994).

Activities That Can Cause Detrimentally Disturbed Soils – The soils in an activity area are considered detrimentally disturbed when the following soil conditions exist as a result of Forest practices:

A. Detrimental displacement is the removal of 1 or more inches (in depth) of any surface soil horizon, usually the A horizon, from a continuous area greater than 100 square feet.

B. For volcanic ash-influenced surface soils, compaction results in a 20 percent or more increase in bulk density, or a 50 percent reduction in water infiltration rates. Soil compaction reduces the supply of air, water and nutrients to plants. Roading, ground-based yarding and dozer piling are the major contributors to compaction.

C. Severe fire consumes most woody debris and the entire duff and litter layer, exposing mineral soil. Burn ashes are white or reddish color, indicating that much of the carbon was oxidized by fire (Burned-Area Emergency Rehabilitation Handbook FSH 2509.13). Burns that create very high temperatures at the soil surface when surface soil moisture content is low result in almost complete loss of surface and upper soil horizon organics. Many of the nutrients stored in these organics can be lost to the atmosphere through volatilization and removed from the site in fly-ash (Garrison and Moore 1998).

Loss of Potassium - An important element in site productivity is potassium. Some preliminary research being done by the Intermountain Forest Tree Nutrition Cooperative (IFTNC) is showing a possible link between potassium deficiency and the lack of tree resistance to root disease. However, this correlation is an observation and has not been tested. On some sites 45 percent of the potassium is held in trees, with the remainder being held in subordinate vegetation, forest floor and soil pools. Within the trees, about 85 percent of the potassium is held in the branches, twigs and foliage (Garrison and Moore 1998). In most natural circumstances the potassium returns to the soil when the tree dies.

If potassium is removed from the site, the loss is long-term. Unlike many other soil nutrients, potassium is derived almost entirely from the underlying rock formations. Some geological formations have been found to have a natural deficiency of potassium, including the Pritchard formation. The intrusive rock formations are the dominant geologic type in the Upper West Branch drainage covering about 74% of the watershed. Pritchard formation rocks are found on about 22% of the watershed area.

Whole tree yarding and removal of tree tops can lead to the direct loss of potassium (Morris and Miller 1994). The Intermountain Forest Tree Nutrition Cooperative is continuing to research potassium contents within tree species and different rock types in order to establish more definite minimum thresholds and effects on tree growth and resistance to root diseases. Until these minimum thresholds are developed through research, the Idaho Panhandle National Forests are using management recommendations from the IFTNC as a guideline for maintaining sufficient potassium on a site. During 2002 and 2003, the Idaho Panhandle National Forests began doing tree foliar analysis in cooperation with the IFTN Cooperative in order to gather more information on forest potassium levels. Information gained from these samplings will be used to obtain baseline data pertaining to soil nutrient levels and tree growth and health.

The IFTNC has made the following management recommendations to retain the maximum possible amount of potassium on site after logging:

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

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

c) *Light broadcast burn or underburn for release of potassium and other nutrients.*

d) *Avoid mechanical site preparation except for grapple piling of over wintered slash.*

e) *Plant species appropriate to site.*

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

3.62c Existing Condition

Past Logging Activities – To determine whether past activities occurred in proposed treatment areas, the TSMRS database was queried. This query found that only 32 acres had past logging activities consisting of tractor logging, piling and burning (project file). Each of these stands meet the forest soils guidelines of restricting detrimental soil impacts to less than 15% of the treatment area.

The remaining stands proposed for treatment within the project area either have not had past activities or there was minimal salvage harvest (mostly roadside) using skyline yarding with no substantial impacts (Sale Area Maps, District Files). Skyline logging systems have been shown to produce little to no (0-2%) detrimental impacts (Niehoff 2002; McIver and Starr 2000, pp.11-16).

Existing Roads - Existing roads constructed in the past that are designated as “classified” on the National Forest transportation system are considered “dedicated” lands. The loss of soil productivity on these sites was an irretrievable effect when the roads were constructed.

3.63 Environmental Consequences

3.63a Methodology

This analysis includes potential effects from proposed logging systems, permanent and temporary roads, landings, and fuels treatments on soils. To determine whether proposed activities would detrimentally impact or have cumulative effects on soils, we used the IPNF Soil NEPA Analysis Process (Niehoff 2002). For each alternative, the detrimentally disturbed acres were calculated using coefficients based on past Forest soil monitoring data. This monitoring information is contained in Forest Plan Monitoring and Evaluation Reports and is summarized in the IPNF Soil NEPA Analysis Process. For direct and indirect effects, the calculations incorporated the acres and types of proposed logging, burning, and the acres of roads and landings constructed.

Direct effects on soils from proposed activities were measured by analyzing the effects of compaction, displacement, and severe burning on the soil surface, since this is the most productive layer and also the easiest layer to disturb through normal land use activities. The potential for these effects would result from the type of logging system and fuel treatments used, and the construction of roads and landings. Compaction, displacement and severe burning can affect soil physical, chemical and biological properties, which indirectly can affect the growth and health of trees and other plants. Compaction reduces soil permeability and infiltration, which can cause soil erosion. Displacement reduces plant growth where topsoil and organic matter are removed. Tractor, skyline, and helicopter logging systems are included in varying amounts for each action alternative.

Roads and landings constructed that are to remain on the landscape for future use cause irretrievable effects on productivity as those lands become “dedicated” to the permanent transportation system. Those that are temporary (i.e. only needed for the project) and are planned for decommissioning have detrimental effects initially but rehabilitation efforts (subsoiling, recontouring) initiate a long-term recovery process.

Based on past monitoring efforts (Niehoff 2002), tractor logging prior to 1990 has had the most detrimental impacts to soils (between 24% and 42%). Since 1990, tractor-logging methods and recommended protection measures have decreased most detrimental impacts to an average of 13%, two percent less than the maximum allowable criteria established by regional guidelines. Helicopter and skyline logging systems tend to have between 0% and 2% detrimental effects (Niehoff 2002, McIver and Starr 2000, pp. 11-16). These logging systems have less impact than tractor systems because the equipment stays on the road, and the logs are partially suspended over the ground; impacts to soils in skyline logging result largely from the logs being dragged over the ground (Krag 1991, Seyedbagheri 1996 pp.7-9). Helicopter logging has minimal impacts as the logs are lifted into the air and transported to a landing site (Poff 1996, McIver and Starr 2000, pp. 11-16). The landing site, which consists of a cleared area averaging one acre in size, may be the most impactive part of helicopter logging since large trucks and equipment compact the ground as they process logs for transport.

Acres of detrimental disturbance were calculated by multiplying the acres of activity disturbance by the disturbance coefficient derived from monitoring reports. Coefficients used for proposed logging systems were:

Tractor Logging	
With spring burning or grapple piling	13%
With fall burning	15%
Skyline and Aerial Logging	
With spring burning	0%
With fall burning on south/southwest aspects	2%

Coefficients for road construction used 35-foot widths, which take into account a 14-foot wide surface, and cut and fill slope disturbance. Landing sites constructed along with road construction were accounted for in road calculations. Landing sites outside of proposed units were calculated at one acre each. Since these sites are along existing roads, they would become dedicated lands and cause irretrievable effects.

Indirect effects include the loss of site productivity due to removal of large woody debris and potassium. Large woody debris is essential for maintenance of sufficient microorganism populations. Research has indicated that potassium is an important element in site productivity. Mitigation measures were designed to meet the management of large woody debris and organic matter as detailed in the research guidelines contained in Graham et al. (1994). These recommendations emphasize tons/per acre and are not dependent on specific diameter size classes of material. On potassium limited sites, foliage and branches would be left over the winter to allow potassium to leach out of these materials (Garrison and Moore 1998). See Features Designed to Protect Soils and Site Productivity in Chapter II for all soil protection measures proposed.

Cumulative effects include the combination of direct and indirect effects with effects of past, present and reasonably foreseeable activities. Since direct and indirect effects from soils are measured within “activity areas,” the cumulative effects analysis area for the soils resource consists of those activity areas proposed for soil-disturbing activities within the project area only where previous management activities have occurred.

Existing roads and landings designated as "classified" on the National Forest transportation system are considered designated lands. The loss of soil productivity on these sites occurred when the roads and landings were constructed and was an irretrievable effect; therefore, these lands are not considered in cumulative effects.

3.63b Direct and Indirect Effects

1. Effects Common to All Alternatives

Risk of Lethal Wildfire – Given the decades of fire suppression that have occurred in this watershed, the chance of a lethal fire occurring is high if a fire ignites in an untreated area in extreme, dry weather conditions. As stated in the Fire and Fuels section, the proposed vegetation and fuels treatments in this project would not necessarily prevent a lethal fire from occurring in the Upper West Branch drainage, but it would increase our ability to suppress such a fire were it to ignite on treated acres. Vegetation and fuels treatments would also reduce the chance that a wildfire would have as severe an effect on the soils in treated areas as it would in untreated areas since there would be reduced tons per acre of fuels on these sites (see Fire and Fuels discussion in the Vegetation section).

If such a fire occurred and could not be safely suppressed, there would be a high potential for impacts to soils in areas of severe burning. These impacts would increase the risk of soil damage that would detrimentally reduce the productivity of the soil. Erosion increases following a fire are directly proportional to fire intensity (Megahan 1990, p. 146). Burn ashes are white or a reddish color, indicating that much of the carbon was oxidized by fire. Other effects would include the loss of organics, loss of nutrients, and a reduction of water infiltration (Wells et al. 1979, p. 26). Burns that create very high temperatures at the soil surface when surface soil moisture content is low result in almost complete loss of most woody debris and the entire duff and litter layer, exposing mineral soil. Many of the nutrients stored in these organics can be lost to the atmosphere through volatilization and removed from the site in fly-ash (DeBano 1991, pp. 152-153; Amaranthus et al. 1989, p. 48). A loss of potassium would occur through fly ash removal.

Overall, if a severe fire were to occur that caused hydrophobic soils, there would be moderate potential for surface erosion and low potential for mass failure throughout the project area because of its underlying landtypes. The primary risks for erosion and mass failure would be from roads, especially at stream crossings in the event of debris flows. These risks are discussed in more detail in the Watershed section. Following a severe fire, rehabilitation efforts to mitigate the fire's effects on erosion and sediment delivery would likely occur, substantially reducing potential negative effects.

2. Alternative A (No Action)

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

The continued absence of fire would affect the structure, composition, and function of the soil resource (Landsberg 1992, p. 8). In terms of indirect effects, continuing tree mortality would ensure sufficient nutrient capital by creating large downed wood. Potassium would stay on the site and be released to the soil through decomposition.

3. Effects Common to Alternatives B, C and D

Refer to figures H-1 to H-8 in Appendix H for maps of proposed activities and tables C-1 to C-3 in Appendix C for logging systems.

To reduce the impacts to soils, each alternative would protect soil productivity through the use of Soil and Water Conservation practices as outlined in the Soil and Water Conservation Practices (SWCP) Handbook FSH 2509.22. This handbook outlines Best Management Practices (BMPs) that protect the soil and water resources at a higher level than do existing Idaho Forest Practices rules and regulations, thereby incorporating all Idaho state standards. BMPs would have a moderate to high effectiveness in minimizing soil erosion (IDEQ 2001). Other BMPs would deal with seeding disturbed areas, limiting operations when soil moistures are high such as during the spring months, and conduct of logging. Specific BMPs and their effectiveness ratings are included in Appendix A.

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

Road Construction – Alternative B proposes 2.5 miles of temporary road construction, and Alternative D proposes 0.3 miles of temporary road construction. This road construction would cause soil compaction and displacement and would cause some irreversible effects to site productivity (see "Irreversible and Irretrievable Commitment of Resources" later in this Chapter) due to the removal of topsoil.

The road construction in Alternative B would impact 16 acres and 5 acres in Alternative D. Alternatives B and D propose the construction of 0.7 miles of new classified road for use as a snowmobile rerouting. The remaining roads proposed in Alternative B and D are temporary and would be decommissioned.

Road Decommissioning – In Alternatives B and D, 28 miles of existing roads would be decommissioned. This would begin the restoration of 140 acres. In Alternative C, 26 miles of existing roads would be decommissioned. This would begin the restoration of 130 acres. Decommissioning would include ripping and recontouring the road prism, culvert removal, stabilizing fill slopes, restoring stream channel crossings back to natural grade where applicable, seeding, fertilizing, planting trees, and topping the areas with woody debris. This would begin to restore the soil productivity and hydrologic function on these road sites by decompacting the soil and replacing some of the topsoil that was buried under the road fills.

Road Storage – In Alternatives B, C, and D, there are 30 miles of existing roads would be put in storage after use for the project. Past monitoring shows that compaction and risks of erosion and sediment delivery would be reduced substantially while in storage (USDA 1999, p.38; USDA 2000, p. 34); however, this condition would only occur until these roads are needed for future management. Therefore, roads put into storage are considered dedicated lands with irretrievable effects.

Road Maintenance – No additional impacts to soil would occur from proposed road maintenance activities (blading, drainage improvement and surfacing) on existing roads, which are considered dedicated lands.

Vegetation Treatments – This analysis assumes that all proposed activities would occur during non-winter conditions to show potential effects of activities when they would have the greatest potential for impact. Some units could be logged during winter months, and if so there would be reduced effects of compaction and displacement than that which was estimated in the analysis (Krag 1991, p.64).

Alternative B proposes regeneration cutting on 840 acres and selective cutting on 807 acres. Alternative C proposes regeneration cutting on 840 acres and selective cutting on 728. Alternative D proposes selective cutting on 808 acres. Three different logging systems are proposed to accomplish these activities (see table 2-1, Chapter II). Fuels treatments are proposed on all these acres.

A direct effect of management actions, particularly in stands where multiple activities such as road and landing construction, fuels treatment, and tractor logging are planned, would be an increase in detrimental soil disturbances such as compaction and displacement. Using design and mitigation measures listed in "Features Designed to Protect Soil and Site Productivity" in Chapter II and data from past project monitoring (Niehoff 2002), detrimental impacts are predicted to be no more than 15 percent total in any proposed activity area under any of the action alternatives (see table 16 and project file). Minor disturbances would occur on skyline and helicopter-logged units and where fireline is constructed around units, but past monitoring shows these activities result in very little detrimental impacts (USDA 1991). A complete list of units and their predicted disturbance is available for review in the soils section of the project file.

The helicopter landing sites shown in Figures H-1 to H-3 (Appendix H) are all *potential* locations. These were placed on each map for planning and analysis purposes; however, not all of these may be constructed. Where landings are located within a cutting unit, they were considered in the activity area calculations for detrimental impacts. Helicopter landing sites are estimated to impact about one acre of soils each.

Disturbance on these sites due to compaction, displacement and pile burning would result in some irretrievable effects, meaning productivity would take a long time to be recovered but the effects are not irreversible. Landings associated with existing classified roads would become dedicated lands. These sites would be scarified and seeded after use. All non-dedicated landings would be stabilized with subsoiling to re-establish hydrologic function and revegetated to prevent erosion. These measures would help restore soil productivity in the long-term (Carr 1989).

Harvesting on all sites would remove, with each tree bole, about 14 percent of the potassium that is contained within a tree, which may have an indirect effect on some plants. The percentage of the existing tree boles that would be removed from within the proposed treatment units varies by the type of silvicultural prescription that is being proposed. A positive effect would occur when the foliage and branches of harvested trees are left to recycle on site, thereby releasing stored nutrients such as potassium and nitrogen back to the soil. The release and availability of this stored potassium would benefit larch and ponderosa pine, which require less potassium for growth and maintenance (Garrison and Moore 1998). These more potassium-efficient trees would be planted in all regeneration harvest units and retained within selective cutting units.

Prescribed Burning and Slash Disposal - Alternatives B and C propose 860 acres of underburning, 580 acres of limb and lop fuel treatments along with 205 acres of grapple piling and burning. Alternative D proposes 93 acres of underburning, 540 acres of limb and lop fuel treatments along with 205 acres of grapple piling and burning. To the extent feasible, all fuel treatments would retain the maximum possible amount of coarse woody debris and potassium on the site after logging consistent with the fuel treatment objectives of the site. All low potassium acres would meet the recommendations of the IFTNC.

In order to minimize potential potassium concentration in piled areas, slash would be allowed to remain on site over the winter prior to piling to allow nutrient leaching to take place. The grapple piled sites could end up with more fines removed (potassium) off some areas and concentrated primarily on skid trails for burning. Burn piles would be formed after the leaching process, and burned during cool, wet fall weather to mitigate potential soil damage.

Conclusion – For the following reasons, none of the areas where activities are proposed under any alternative are expected to exceed Forest Plan or Regional Soil Quality Standards

- logging systems consist mostly of skyline and helicopter systems (see table 2-1, Chapter II),
- design and mitigation measures would be used to keep detrimental impacts at low levels,
- the amount of road construction is limited, and
- most proposed roads would be decommissioned (see Chapter II, Features Designed to Protect Soil and Site Productivity).
- no activity areas are located on highly sensitive landtypes and detrimental disturbance from proposed activities is predicted to be no greater than 15%.

3.63c Cumulative Effects

1. Past Activities

By using the soil mitigation measures described in Chapter II and proposed helicopter yarding, there would be little if any change to the existing detrimental soil disturbance level and, therefore, no cumulative effects of proposed activities on soils.

2. Ongoing and Reasonably Foreseeable Activities

The ongoing and reasonably foreseeable activities applicable to the soils analysis are fire suppression and native seeding. Helispots, landings and existing roads are all dedicated lands and uses. Firewood gathering and hunting are activities that have undetectable impacts to soils because they are generally dispersed across the project area. Noxious weed treatment and timber stand improvement would not cause compaction, displacement or burning since these activities do not use large machinery or fire.

Fire Suppression – Successful fire suppression activities would eliminate the chance of a severe wildfire that could have detrimental impacts to soil productivity. The ability to predict where fire suppression activities would occur is difficult. Light suppression activities, hand fireline construction and use of water or retardant would likely have little detrimental effect. Use of large machinery to construct firebreaks could have cumulative compaction and displacement effects if such use occurred in proposed treatment areas following project activities.

Native Seeding –Seeding with native and desired non-native species following prescribed burning would provide beneficial effects to soils by establishing vegetation quickly on the sites and would increase soil holding capabilities.

3.63d Consistency with the Forest Plan and other Regulatory Direction

All alternatives would comply with Forest Plan Standards and Regional Soil Quality Standards (FSH 2509.18) related to detrimentally disturbed soils, maintaining or exceeding 85 percent of the area in a productive state.

Soil disturbing management practices would not exceed 15 percent detrimental conditions and would maintain at least 85 percent of each activity area in a condition of acceptable productivity potential for trees and other managed vegetation. Large woody debris would follow the research guidelines of Graham et al. (1994) to insure the maintenance of site productivity. IFTNC guidelines would ensure the retention of the maximum amount of potassium on sites after treatments.

As discussed in the cumulative effects section, no additional impacts to the previously tractor-logged area would occur that would cause Forest Plan or Regional Soil Quality standards to be exceeded.

3.7 Watershed and Fisheries

This discussion focuses on the existing condition for aquatic resources in the Upper West Branch drainage and what the effects would be from implementing any one of the alternatives. As discussed in Chapter II, three factors were selected on which to focus the analysis: Sediment Production and Delivery, Water Yield Increases and Sediment Risk Associated with Road Drainage Crossings. All of these items serve as indicators for measuring how the alternatives may impact water quality and, ultimately, fish habitat.

3.71 Regulatory Framework

The regulatory framework governing management of watershed and fisheries for the analysis is based on:

- *National Forest Management Act*
- *Endangered Species Act*
- *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)*
- *State of Idaho Governor's Bull Trout Plan*
- *Clean Water Act and amendments.*

The National Forest Management Act (NFMA) (1976) requires that the Forest Service manage for a diversity of fish habitat to support viable fish populations (36 CFR 219.19). Regulations further state that the effects on these species and the reason for their choice as management indicator species be documented (36 CFR 219.19(a)(1)). Direction is also included in the Idaho Panhandle National Forests Forest Plan (USDA 1987). The Inland Native Fish Strategy (INFS) (USDA

1995) amended some Forest Plan direction regarding stream and fish habitat protection measures. See Appendix B for details.

The Idaho Panhandle National Forests has specific references addressing aquatic resource goals. These goals are found on pages II-1 and II-2 of the Forest Plan. According to Goal #18, the Forest will "maintain high quality water to protect fisheries habitat, water-based recreation, public water supplies and be within state water quality standards." Specific standards for water resources are found on page II-33 of the Forest Plan. The focus of these standards is to ensure that activities on National Forest lands do not impair water quality and will adhere to state water quality standards. There is no listing of specific numerical thresholds or standards for water quality given; instead, the Forest Plan relies on state standards.

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.

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 be in compliance 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."

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.

3.71a Clean Water Act

The principal law governing pollution in the nation's streams, lakes, and estuaries is the Federal Water Pollution Control Act (P.L. 92-500, enacted in 1972), commonly known as the Clean Water Act (as amended in 1977, 1981 and 1987). The Clean Water Act is the primary federal law that protects the nation's waters, including lakes, rivers, aquifers and coastal areas. The Act's primary objective is to restore and maintain the integrity of the nation's waters.

Through the Clean Water Act, each state is required to provide guidance and direction to protect and restore water bodies. The States of Idaho and Washington have met this federal requirement through their state Best Management Practices (BMPs). The Forest Service is required to meet and/or exceed State Best Management Practices to protect water quality (Forest Plan, p. II-33).

Beneficial uses and water quality standards are usually specific to a particular water body. The "water quality criteria" for determining whether a beneficial use is being attained are set out in IDAPA, 58.01.02.250 ("Surface Water Quality Criteria for Use Classifications"). Since the Upper West Branch currently maintains coldwater biota, supports spawning of westslope cutthroat, and is used for recreational fishing and supplies domestic water, it has a default designation for these beneficial uses.

The Idaho Department of Environmental Quality and the Washington Department of Ecology have assigned “designated beneficial uses” to many water bodies in their respective States. Within the State of Idaho, the only water body in the Priest River HUC that is currently cited in the state Standards is the Lower Priest River, from Priest Lake to the mouth. The State of Washington does not specifically mention the Upper West Branch in any standards. Water bodies not specifically listed by either State are assigned beneficial uses based on data and observations. Therefore, the Upper West Branch of the Priest River has designated beneficial uses including domestic water supply, cold-water biota, salmonid spawning and primary and secondary recreation. Within the cumulative effects analysis area (see project file), beneficial uses include domestic water supply, salmonid spawning, coldwater organisms, irrigation, and recreation.

Table 3-19. Beneficial Uses in each drainage of the cumulative effects analysis area.

Watershed	Municipal /Domestic Water Supply	Salmonid Spawning	Cold Water Organisms	Irrigation, Livestock Water	Fishing, Boating, Wading
Upper West Branch	X	X	X	X	X
Goose Creek	X	X	X	X	

The Forest Service is required by law to comply with state water quality standards developed under the Clean Water Act as stated above. The Environmental Protection Agency (EPA) and the States of Idaho and Washington are responsible for enforcement of these standards. The States’ water quality standards regulate non-point 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 the States’ waters do not contain pollutants in concentrations that adversely affect water quality or impair a designated use. The use of Best Management Practices (BMPs) is also required in the Memorandum of Understanding between the Forest Service and the States as part of our responsibility as the Designated Water Quality Management Agency on National Forest System lands. State-recognized BMPs that would be used during project design and implementation on National Forest lands are contained in Appendix G.

Under the Clean Water Act 303(d) and the EPA regulation (40 CFR 130.2(J), 130.7), states are given authority to list which waters do not meet water quality standards or have impaired beneficial uses. This list of impaired waters is commonly known as the “Section 303(d) list”. The individual states are directed by the EPA to improve the aquatic conditions of those streams not supporting beneficial uses. Once a water body is listed as impaired, it is the state’s responsibility to develop a Total Maximum Daily Load (TMDL) for each pollutant of concern. These TMDLs are then submitted to EPA for review and approval or disapproval. The most current official list of streams not supporting beneficial uses is the 1998 303(d) list. Neither the Upper West Branch nor Goose Creek were on that list.

More recently, the mainstem of the Upper West Branch and its tributary (Goose Creek) have been identified on the DEQ's "Draft Integrated (303d/303b) Report" as streams that do not currently support beneficial uses. There is not a similar listing in the State of Washington for either stream. If the "draft" listing were approved by the EPA, the State of Idaho Department of Environmental Quality (DEQ) would be directed by the EPA to improve the aquatic conditions of the Upper West Branch and Goose Creek. All of the streams within the analysis area would potentially be affected by proposed activities and thus are considered as candidates for improvement activities.

In DEQ's Draft 2002-03 Integrated Report, the Upper West Branch was proposed to be listed for "unknown" pollutants and water temperature; the Goose Creek drainage is proposed for listing for bacteria as the pollutant of concern. From a recent conversation with DEQ (Rothrock pers. comm. April 14, 2003), the time line for developing a TMDL for the Upper West Branch is 2007. Until that time, efforts must be made to improve the current situation where possible to create a long-term benefit to the streams. Given that the 2002 Draft Integrated 303(d)/303(b) list is still a draft, the Forest Service will recognize and thus operate under the 1998 official 303(d) list.

Idaho's Antidegradation regulations make a specific provision for water quality limited segments for which no approved TMDL yet exists. IDAPA 58.01.02.054.04 for medium to low priority waters (which is the status for the Upper West Branch and Goose Creek) is less restrictive than for high priority waters. For these medium and low priority waters, there is only the requirement to use best management practices for non-point sources deemed necessary to prohibit further impairment of the designated or existing beneficial uses.

3.72 Methodology

Information for the watershed and fisheries analysis relied on data from field surveys, district fish/hydrology files, historical records, aerial photographs, Geographic Information Systems (GIS) analysis, published scientific literature (see references list), the North Zone Geographic Assessment (USDA draft in progress), the WATSED Model, the Idaho Department of Fish and Game (IDFG), and the Department of Environmental Quality (DEQ, BURP Studies). All supporting information can be found in the project file.

Analysis Areas: Within the analysis area, there are ten drainages that will be addressed in this report: Upper West Branch, Goose Creek, Consalus Creek, Solo Creek, Galena Creek, Klahowya Creek, Tola Creek, Blonc Creek and two unnamed first order streams. Each of the subbasins will be assessed for direct and indirect effects. The Upper West Branch will be the focus of the cumulative effects analysis.

The cumulative effects analysis for the proposed Chips Ahoy project includes the entire Upper West Branch drainage. The proposed activities are primarily located in the State of Idaho in the middle to lower third of the drainage. The mainstem of the Upper West Branch is primarily a low gradient stream in the lower reaches of the project area. Field surveys of the mainstem of the Upper West Branch in 1998, 2002 and 2003 documented a number of natural sediment traps (e.g. large woody debris), point bars and high sinuosity that would enhance sediment deposition. Any sediment that was delivered to the mainstem from project activities would be deposited within a few hundred feet once it was delivered to the stream. There is no reason to expect that any sediment generated from any of the proposed actions would move beyond the confines of the project area, let alone reach the Priest River. Therefore, since no sediment is expected to reach the Priest River, the cumulative effects area is truncated at the confluence of the Upper West Branch and the Priest River.

Field Reviews: Roads and streams in the project area were surveyed during the 1997, 1998, 2002 and 2003 field season. Field surveys prior to 2002 were conducted in support of the previous Douglas Fir Beetle Salvage effort and the winter blow down salvage sales. Road information was gathered on multiple variables (e.g. pipe and size, inlet and outlet depths, pipe length, road condition, etc.; see project file of sample field form).

Stream data were collected to provide the project fish biologist and hydrologist with quantifiable information to describe current conditions and to evaluate possible effects from the action alternatives. A modified version of the R1/R4 fish and fish habitat inventory (Overton et al. 1997) was conducted in the streams (see project file for variables collected and summarized). Additional stream information was collected to determine channel typing (Rosgen 1996), stream channel types, cross sectional profiles, woody debris composition and stream temperature.

Electrofishing surveys were completed in 2003 for fish species presence in the analysis area. Existing and potential in-channel and stream-bank erosion sites were also documented with a survey conducted in 1998 (Lorentzen and Radenmacher) and 2002 (Dekome, Johnson and Deiter) to evaluate the effects of grazing on the streams in the Upper West Branch. Many of the streams were photographed to provide a visual record of stream condition as well as a baseline for future monitoring. These photographs are located in the project file.

Aerial Photos: Aerial photos from 1949 and 1996 were used to assess overall slope and stream stability and review of past land management activities within the cumulative effects analysis area.

GIS Technology: Geographical Information Systems (GIS) were used to combine existing databases, proposed activities and data taken from aerial photos to create maps and summary tables of existing conditions. Landtype maps and descriptions were input into GIS layers to evaluate the existing condition and for the effects analysis.

WATSED Model: The anticipated sediment and water yield runoff for the Upper West Branch drainage and subdrainages were estimated from the methods documented in the R1/R4 Sediment Guides (USDA 1981), WATBAL Technical User Guide (Patten 1989) and WADA (USDA WADA (WATSED Automated Data Assembler), undated). 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 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 average climate patterns in the watershed. In this analysis, the existing condition represents the year 2003, which is before 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 is not intended or 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. WATSED does not evaluate increases in sediment and peak flows specifically resulting from "rain-on-snow" or other stochastic events, nor does it attempt to estimate in-channel and stream-bank erosion. Additionally, the model assesses roadwork as new construction, and, therefore, the sediment and water yield values are artificially inflated. Finally, the WATSED model does not allow for water yield recovery from roads as it does from vegetation treatments (Patten, personal comm.).

The Idaho Panhandle National Forests (IPNF) frequently validates the WATSED coefficients and estimates using long-term water quality monitoring networks on the IPNF (USDA 2000, 1999 and 1998). The model is a predictive tool and the values should not be used as absolute values, but rather as a comparison of possible alternatives. 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 to 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 2000, 1999 and 1998) describe how the calibration and validation of WATSED have been an annual process on the forest and where changes have been made.

The model, however, also includes simplifying assumptions, and does not include all possible controlling factors. Therefore, the use of models is to provide one set of information to the technical user who, along with 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. Recent validation of WATSED runs indicated that the WATSED measured responses were accurate for flow, but appeared to overestimate sediment loads (USDA 2000). To date, the WATSED model is the most appropriate tool for hydrologists to use when assessing cumulative effects in snowmelt dominated, mountainous watersheds (R. Patten, personal communication).

3.73 Affected Environment

3.73a Watershed Characterization

Upper West Branch Watershed (45,370 acres): The Upper West Branch Watershed drains portions of both Washington and Idaho (see figure H-17 in Appendix H). The drainage is underlain primarily with granitics, with occasional outcroppings of belt rocks and some alluvial and outwash deposits in the valleys and lowlands. The highest elevation of the drainage is at its headwaters near Hungry Mountain at 5,552 feet. The mainstem of the Upper West Branch is about 22 miles long, and there are approximately 112 miles of perennial streams. The mean annual precipitation within the basin is about 42 inches; the majority of precipitation is snow. The peak stream runoff events are associated with spring melt that occurs from April through May.

According to the records of the Idaho Department of Water Resources, there are nineteen water claims within the private land located in the Upper West Branch drainage near the project area. Of these claims, seventeen are for irrigation and two are for domestic water use. Streams within the project area include stream habitat for several species of native fish. Fishing, swimming and floating are the primary recreational uses of the water. For the purposes of this analysis, beneficial uses that could be affected by the proposed action include coldwater biota and fisheries.

Past road construction and timber harvesting have impacted the basin. The average road density for the entire drainage is 5.1 miles per square mile. Many roads within the drainage are closed by brush, and others have been systematically closed by the Forest Service to protect aquatic resources and wildlife. Currently, approximately 177 miles of road in the watershed are open and drivable. Another 185 miles of road are either impassable or restricted. Additionally, there are 30 miles of recreation trails and 26 miles of abandoned skid trails. Historically, approximately 28 percent of the drainage has been harvested, though currently only about 8.2 percent of the drainage is in Equivalent Clear-cut Acres (ECAs).

Of the approximately 45,370 acres in the drainage, about 1,600 acres are privately managed lands and are mostly used for agriculture. The privately managed lands are mostly located in the Big Meadows area, in the lower third of the larger basin. The Forest Service manages the remainder of the drainage for the public.

Land use in the Upper West Branch includes logging, road construction, agriculture, grazing, home development and recreation. The drainage is currently under review for designation as a water quality limited segment. Recent surveys by the Department of Environmental Quality suggest that the Upper West Branch drainage has elevated sediment loads and elevated stream temperatures. Goose Creek has both the sediment and temperature concerns along with elevated nutrient loading. In 2001, the Forest Service relocated 0.6 mile of Road 312 that was encroaching on the mainstem of the Upper West Branch; post-project monitoring documented that the project was effective at restoring floodplain access (Cobb 2002, Best Management Practices and Accomplishments Monitoring Report).

The Upper West Branch is a complex sand-dominated drainage (Cobb 1998; Lorentzen and Radenmacher 1998, Cobb 2003) that has moderate sinuosity and is supporting limited fisheries. Surveyors note that, while the stream is dominated by sand, there are pockets of bedrock outcrops (e.g. Mission Falls) that alternate with extensive mobile deposits of sand. The majority of the Upper West Branch River is mainly a low-gradient stream with extensive access to its floodplain. Surveys of the channel document that historically beaver may have played an active role in channel dynamics. There are only limited observations of recent beaver activity.

The uppermost headwaters of the drainage have not been harvested for a number of years and are currently not accessible by motor vehicle because of a failed bridge. The largest tributary to the Upper West Branch is Goose Creek. Most of the smaller drainages average three to four percent gradient and function as transport channels for sediment delivery to the mainstem of the Upper West Branch. The headwaters of the Upper West Branch appear to be fairly stable (Cobb 2002).

The lower reaches of the Upper West Branch are quite complex hydrologically. Field notes (Radenmacher and Lorentzen 1998) document that the stream has ample large woody debris, fairly deep pools and an abundance of sand. The stream is transporting elevated levels of sand through the system, and the bedload has exceeded the stream's ability to transport. The channel's condition is further compromised by recent stream disturbance on private lands within the basin. The historical logging, roading, removal of beaver and disturbance on private lands has caused the stream to be hydrologically unstable. There is more sediment within the stream than it is able to transport; the result is a wider, shallower channel profile.

In October 2001, the Idaho Department of Environmental Quality (DEQ) addressed the current conditions of the Upper West Branch in a larger report titled "Priest River Subbasin Assessment and Total Maximum Daily Load". In that report, the DEQ summarized the Upper West Branch as having "very sandy substrate, poor instream cover and pool complexity, and some stream banks damaged by cattle grazing and other riparian zone disturbances." Further in the report, the DEQ summarized their findings: "Based on low salmonid density from electrofishing efforts, a high percent of fines in stream channels, and bacteria results that were near or exceeded State Standards, the Upper West Branch watershed will be more thoroughly evaluated as DEQ prepares the 2002 303 (d) List. Goose Creek will be evaluated for 303(d) listing with bacteria as the pollutant of concern."

Goose Creek (13,327 acres): This stream originates in the southwestern portion of the larger Upper West Branch drainage and ranges elevation from 6,000 feet to 2,500 feet. This is the single largest tributary to the Upper West branch and includes almost 22 square miles. The stream was surveyed in 1998 (Wingert 1998). The survey documented that the channel had high concentrations of gravel and sands. The 1998 survey results were reaffirmed by a survey in 2003 (Cobb 2003). The drainage was found to be adversely impacted by an early railroad that crossed Big Meadows and by ongoing cattle grazing. As a result of these actions, Goose Creek has been trenched and straightened through the meadows and has very unstable banks that lack stabilizing vegetation.

Named tributaries to Goose Creek include Consalus, Hathaway, North Fork Goose and Blonc Creeks. In 2002, the Forest Service obliterated almost 1.6 miles of Road 333 that was encroaching on the mainstem of Goose Creek near its headwaters. In the fall of 2002, the old road location was resurveyed to determine site stabilization, possible improvements and reestablishment of vegetation. The surveyors found that overall the road was stable, though there were some instances where stabilization efforts could have been improved. The road was revegetating well after seeding and planting efforts. The survey results and photos are available in the project file (Weidich and Cobb 2002).

The Goose Creek drainage is still recovering from intensive historical land practices. The headwaters of Goose Creek should continue to improve given the recent riparian road removal. The middle and lower portions of Goose Creek are still destabilized by the past ditching, rail roading and agriculture. An additional burden for this portion of the creek is the long-term sorting and transportation of sediments transported to the lower reaches from the historically heavily roaded headwater drainages (i.e. Consalus, headwaters Goose and Blonc). Although many of the older road networks are not actively delivering sediment today, sediment from the initial construction is still being processed through the lower reaches of the drainage.

Consalus Drainage (4,035 acres): This is the single largest tributary to Goose Creek. In the near future, the Forest Service will be obliterating 2.6 miles of Road 1108 that is encroaching on the channel (USDA 1999). This stream was surveyed in 1998 (Wingert and Hamilton 1998) in support of the Douglas Fir Beetle EIS. According to the survey, the lower end of the channel has been severely impacted by cattle grazing, and the 1108 road is adversely impacting the main channel for several miles within the riparian zone. The lower reaches of the channel are predominantly gravels with a large percentage of sands. The upper two thirds of the channel has ample large woody debris and the channel substrate changes to include cobbles along with the sands and gravels.

The stream was field reviewed in the summer of 2003 by Cobb and Snell (Cobb 2003). They found that the majority of the channel had ample large woody debris. The portion of the channel in close proximity to Road 1108 had elevated bedload, as evidenced by numerous fresh mid-channel and lateral deposits. The culvert crossing of Road 2730 appears to be a fish barrier. The lower most reach of the stream between Road 2730 and Goose Creek had fairly unstable banks. Past and ongoing cattle grazing and the continual delivery of sediment from Road 1108 have adversely impacted the entire channel. Overall, Consalus Creek is a moderately unstable stream that is still transporting high amounts of sediment.

Blonc Drainage (685 acres): This drainage is a tributary to Goose Creek and it has had some timber harvesting and roading. Surveyors reviewed the stream in 1998 (Radenmacher and Papaleo 1998). According to the surveyors there is an abandoned maze of roads within this drainage that have contributed sediment to the stream. Substrate in the channel was primarily small gravels with some sand and cobbles. A few fish were observed though all were brook trout and were all below a natural fish barrier in the lowest reach. The surveyors walked the stream through the private property and found an artificial water impoundment that seemed to be abandoned. Overall, the surveyors considered this channel to be in relatively poor shape.

Galena/Solo Drainages (5,298 acres): Galena Creek is a tributary to Solo Creek, and Solo Creek is a tributary to the Upper West Branch. These basins were surveyed several times over recent years: 1989 (James), 1994 (Huff and Chorzempa), 1997 (Davis), 1999 (Hamilton, Jacobs and Seaborg), 2002 (Rough, Weidich and Carrothers) and 2003 (Cobb and Lorentzen). During the 1999 field season, the Forest Service obliterated 7.4 miles of road in these two basins. The 2002 stream survey found that on Solo Creek, old harvest units line about 40% of the stream length; stream buffers from these older units range from 5 to 200 feet. Most of the identified units were part of the 1990s Solo Basin Timber Sale. Within both the Solo and Galena channels, large woody debris was the primary pool-forming feature. The survey indicated that the streams appeared to have ample large woody debris. The channel gradient for both channels transitioned from steep in the headwaters to moderate in the midslope and quite gentle in the valley.

There was no mention in any of the reports regarding specific sediment sources in the basin. In the 2002 report, cattle grazing was noted in the lower 400 meters of the mainstem of Solo prior to flowing into the Upper West Branch. The 2003 survey focused on Galena and only looked at the portion of Solo Creek from the Galena confluence to the Upper West Branch confluence. In summary, the 2003 report found Galena to be relatively stable. The portion of Solo that is downstream of the confluence with Galena appeared to be transporting elevated amounts of sand, and there was a lack of large woody debris (Cobb 2003).

In summary, Solo Creek is moving toward stability, especially in the headwater and mid-elevation stream sections. The lowermost portion of the stream is moderately stable but is still sorting and transporting elevated levels of sands and gravels. Without future large pulses of sediment, it is highly likely that Solo Creek will continue to improve in terms of overall stream stability.

Klahowya Drainage (1,562 acres): The Klahowya drainage was surveyed in the fall of 2002 (Halcro, Weidich, Rough and Carrothers 2002). The stream had ample large woody debris and recruitment potential was good. Sand dominates the channel substrate, although bedrock is also present. Extensive moss within the channel suggests that the bed is reasonably stable and is not moving with each high flow event. Downstream of the old Road 312C crossing, the channel flows through a bedrock chute with a 20% gradient, although some portions of the chute are up to 70%

gradient. Moving downstream, the channel substrate changed to mostly gravels; pools were abundant, and there was ample large woody debris. The lowest reach of Klahowya Creek was a very narrow, deep sand-dominated channel that flowed through a meadow. Surveyors did not note any specific sources of sediment to the channel. Klahowya Creek appears to be stable hydrologically.

Tola Drainage (1,068 acres): This drainage was surveyed in 1997 (Davis and Cobb), 1998 (Radenmacher and Lorentzen) and 2003 (Cobb and Lorentzen). According to the District's database, this drainage has had 25.6 percent of its area harvested with regeneration units over the past 30 years. Past logging alone did not adversely impact the channel. Heavy grazing by cattle and poorly maintained roads contributed to channel instability.

The 2003 survey found a remarkable improvement in the condition of the channel since it was last surveyed in 1998. Since that last survey, cattle grazing has all but ceased in this drainage, and the grasses and shrubs are recovering. The absence of cattle grazing has resulted in better-vegetated banks and fewer point sources of sediment to the channel. Still, to continue this improving trend, it would be beneficial to develop a long-term cattle allotment plan, obliterate roads excess to the transportation plan and improve the maintenance of those roads that will remain on the landscape. Overall, Tola is improving steadily, but the condition of the channel could deteriorate if heavy cattle grazing were to occur within the riparian zone. At this time, Tola Creek appears to be relatively stable in terms of sediment and water movement through the channel.

Sockwa and Lunar Drainages (691 acres): These two drainages are outside of the project area and are located just downstream of the inaccessible headwater portion of the Upper West Branch drainage**.** These drainages were last surveyed in 1989 by Rob James. These drainages would not be affected in any way by the proposed project.

Paqua Drainage (1,349 acres): Located near the headwaters of the Upper West Branch, this drainage is outside the project area. This drainage was last surveyed in 1989 by Rob James. This drainage would not be affected in any way by the proposed project.

Northeastern Face Drainages: This portion of the Upper West Branch drainage has a southern exposure and has been included in several past timber sales. There are no named streams flowing off this portion of the drainage but surveyors did review three unnamed tributaries as part of this effort (Weidich and Bradbury 2002; Lorentzen, Weidich and Snell 2003). The three surveyed streams were in sections 5, 8, 9, 17 and 16 of Township 59N, Range 5W Boise meridian. The first stream to the east was surveyed and titled "Tributary #1". According to the database, approximately 54 percent of this small basin has been regeneration harvested since 1970. The field survey team found that the channel was steep and that past harvesting did not provide vegetated stream buffers. The roads appeared to have caused more damage to the stream than the previous timber harvesting. Still, Tributary #1 was deemed relatively stable. The second tributary to the west was seasonal in flow and also appeared to be relatively stable. The third tributary (westernmost of the three) was also seasonal in flow; again, no concerns were noted.

Headwaters of the Upper West Branch Drainage (4,778 acres): At the north end of the larger Upper West Branch drainage is a parcel of land that was burned in 1926 and is now part of the Hungry Mountain Inventoried Roadless Area. Although this area was not recently inventoried, review of aerial photos indicates that there was once an extensive road system and that there was likely salvage logging in the area following the fire. Currently, vehicle access to the area is unavailable because the access bridge failed in a flood event many years ago. This portion of the drainage is above the project area and will therefore not be affected in any way by the proposed project.

Kaniksu Marsh: Located in the lower portion of the Upper West Branch Drainage, this unique marsh/peatland complex is a part of a Research Natural Area (RNA). From aerial photos it appears that the marsh was formed in an old abandoned oxbow of the Priest River. In a 2003 survey (Weidich and Snell 2003), surveyors found that the marsh was a "stable aquatic environment". The total wetland feature is about 1.25 miles long and 0.3 mile wide. There is a seasonal inlet on the west end and a seasonal outlet on the southern end. At the time of the survey, no fish were observed in the marsh.

1. Influence of Geology and Soils on Hydrology

The dominant underlying geology of much of the Upper West Branch drainage is granitic batholith. A swath of belt rock runs east to west underlying the lower one-third of the drainage. Alluvium and outwash occur in the meadows and lowlands. Soils within the Upper West Branch drainage are mostly gravel sandy loam and are moderately permeable. In the lower elevations, there are pockets of outwash, alluvium and lacustrine deposits that are fairly deep and less permeable.

Sensitive Landtypes: Sensitive landtypes are defined as those with high potential for mass erosion and surface erosion, and a 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 moderate and high sediment delivery potential (landtypes 103, 104, 105, 109, 465, 467, 468, 517, 557 and 561), but no landtypes are identified as having high mass failure potential. Although there are no areas identified as having high mass failure potential, specific areas within the basin have a moderate risk for mass failures. Full descriptions and maps of sensitive landtypes are located in the project file.

Sensitive landtypes are used to indicate areas where careful planning is needed by applying design criteria and/or restoration activities to avoid resource impacts. Results from WATSED modeling and the amount of proposed activity and reduction of risks on sensitive landtypes are used as indicators for the potential for production and delivery of sediment. Figures H-18 and H-19 in Appendix H show maps of the mass failure potential and the sediment delivery potential for the lands within the cumulative effects analysis area.

3.73b Reference Condition

Several past activities and events have contributed to the reference condition for sediment production and delivery and water yield increases. They include wildfires, early railroads and settlement, manipulation of vegetation, and road construction.

Past Wildfires: Historically, the greatest natural agent of disturbance in the Upper West Branch was wildfire (Arno and Davis 1980, Anderson 1976). In the 1980s, the Forest Service conducted an intensive survey to determine the fire intensity and return interval for western red cedar forests. The Arno and Davis study focused on two areas within the Priest River Basin: the Goose Creek drainage and the Upper Priest River drainage. For the purpose of this analysis, the focus will be upon the results taken from the Goose Creek portion of the study.

From their study, it appears that in the Goose Creek area fire frequency averaged 50 to 150 years with varying fire intensities. The researchers found that certain topographic situations were more predisposed to hot stand-replacing fires, and other areas were predisposed to frequent low-intensity fires. The streams throughout the basin have evolved in response to the wildfires that periodically burned large portions of the landscape. Such events would locally increase water yield and sediment delivery.

Past fires likely resulted in increased water yields (USDA 2002). These fires minimally altered channel conditions of the streams, which were more resilient because they had characteristics (e.g. deep rooted riparian vegetation, ample large woody debris) that made them more stable than they are today. In addition, fires probably did not burn severely in the larger riparian zones in the area.

Railroads and Settlement: In the early 1900s, people began to settle in the Upper West Branch drainage. An early railroad line ran up the Goose Creek drainage and forced the straightening and ditching of much of the natural streambed. Today there are very few physical remnants of the original railroad line. In Squaw Valley, several ranches and homes were developed over the years, and new home sites are still being developed.

Manipulation of Vegetation: The use of this watershed by Europeans began in the late 1800s with early prospectors and trappers. In the early 1900s, farmers and ranchers moved into the drainage and cleared large acreages for agriculture. Logging of the basin began in the 1920s with Forest Service timber sales. The traditional logging peaked in the 1980s after approximately 26% of the basin had been logged. In the 1990s, logging activity gradually diminished, but there was intensive logging in the Solo-Galena sub drainages, the face drainages draining into the Upper West Branch from Binarch Ridge, and the lower flat of the Upper West Branch above its confluence with the Priest River. Since the 1990s, very little of the basin has been logged.

The Forest Service has documented timber harvests within the Upper West Branch drainage and sub-basins since 1920. Figure H-20 illustrates the estimated amount of acres logged by drainage by decade from 1920 until 2000. An article published in 1996 addressed cumulative effects of historic land use on watershed condition. The article documents how the "severe" damage could have been avoided if historical land use had applied current best management practices (Megahan 1996). Current stream conditions in the Upper West Branch are the product of the historical land use described above.

For the purpose of this analysis, the focus will be on vegetation treatments over the past 35 years. There are two reasons to focus on this time frame. The first reason is that there is less confidence in the data collected prior to 1970 because that predated the Forest Service's ability to enter data into a database. The second reason is that much of the effect from roads and timber harvesting would have largely healed over the past 30[2] or so years (Forest Hydrology, 1973, WATSED Results, project file). Given the most accurate database information, it appears that since 1970, approximately **28%** of the Upper West Branch drainage has been harvested (see figure H-21 in Appendix H). Of the **28%** acres harvested, **13.2%** was regeneration harvesting (clear cut, shelter wood and seed tree).

[2] After 30 years, the trees on the site average about 25 feet tall and the canopy is fairly dense. The height of the trees breaks up the air patterns that accentuate rain on snow events. Snowfall is first caught in the dense canopy, and later falls or slowly melts. Furthermore, the dense vegetative growth prevents the movement of sediment off previously exposed soils.

Roads: Road construction in the Upper West Branch drainage has been extensive on both public and privately managed lands. The main roads up the drainages were constructed in the 1920s and 1930s, although the majority of the roads were constructed in the 1950s and 1960s. In all of the drainage, there are approximately 177 miles of road that are open and drivable. According to the most recent assessments (based on field reviews and GIS records), 52 miles of road have been obliterated, 158 miles of road are impassable and 27 miles or road are restricted. Roads and grazing are the two greatest impacts to stream conditions in Upper West Branch drainage. See the Range Section for existing information on grazing.

1. Sediment Production and Delivery

Sediment production and delivery, as used in this analysis, are related to mass failure and surface erosion. Roads are the primary source of this issue, although harvest and site preparation activities will be discussed when they have the potential to create or increase erosion. Roads can potentially increase the natural rate of landslide occurrence by creating unstable road cut and fill slopes and by greatly expanding the number of ways and locations where ground water can be intercepted, rerouted and concentrated (Luce 1997).

Surface erosion occurs on most forest roads because the road surfaces, cutslopes, fillslopes and drainage structures are of native materials that are usually erodible and are exposed to rainfall and concentrated surface runoff. Minimizing the potential for roads to intercept, concentrate and route water to streams and unstable slopes can reduce sediment production and delivery (Chatwin et al. 1994). Maintaining soil organic layers and functioning riparian zones are also strategies used to minimize sediment production and delivery (Belt et al. 1994).

Surface erosion and, to a much lesser extent, mass erosion are part of the natural reference conditions for sediment production and delivery of streams within the analysis area (Dunne and Leopold, 1978 and Leopold et al. 1964). Prior to fire suppression, wildfires frequently altered the structure and composition of forest stands within the analysis area. At times, site conditions following fires would coincide with wet climatic conditions in a season, year, or period of years that would trigger landslides or surface erosion.

Other than topographic characteristics such as slope shape and drainage networks, there were no features such as roads on the landscape that would increase the potential for slope failures or surface erosion by intercepting, re-routing, and concentrating water. Other than natural mass failures caused by channel migrations, there was no major mechanism such as roads that could cause slope instabilities by undercutting or overburdening slopes.

After reviewing a series of aerial photos from 1949 and comparing to a similar set from 1996 (see project file), it appears that the mainstems of the Upper West Branch and Goose Creek have not changed over the past half century despite the extensive roading upstream. The channels have the same sinuosity and general channel configurations (e.g. width) that they had over the past 50 years, and they are still transporting elevated levels of sand. Field reviews in 2003 of the roads and streams in the headwaters suggest that the high road density and early railroad construction has increased sediment and water delivery to the smaller headwater streams (project file), but in these smaller drainages, it appears that the sediment discharge seems to be in balance.

2. Water Yield Increases

Water yield describes the changes in the rate, frequency and timing of water flows in a watershed due to hydro-climatic events such as rainfall and snowmelt. Water yield increases may occur within drainages such as the Upper West Branch when infiltration, transpiration and runoff patterns are altered. There is an extensive amount of literature documenting the increase in water yield in drainages after extensive roading (Harr 1980) and large-scale removal of vegetation (Hibbert 1965, Troendle 1987, Cline et al. 1977). Construction of forest roads substantially alters the hillslope hydrology by causing surface flows in areas far away from established channels. Furthermore, watersheds with dense road networks commonly experience increased sedimentation and peak flows (Luce 1997, Megahan 1985, Ketcheson and Megahan 1996).

Rain-on-snow events occur throughout much of northern Idaho when strong warm moist weather fronts from the Pacific Coast invade during the winter months. These relatively warm and moisture-laden air masses cause mid-winter snowmelt, thaws and rainfall. Snow packs generally between 3,000 to 4,500 feet in elevation accumulate substantial snow in the winter and are often found to achieve isothermal conditions following prolonged warm, moist storm periods. Snowpacks above 4,500 feet tend to be colder and less susceptible to rain on snow events. In the Upper West Branch drainages, approximately 74 percent of the drainage is within the 3,000 to 4,500 foot elevation range that is more sensitive to rain-on-snow (USDA Draft in progress).

While a large percentage of this drainage is located in that “sensitive elevational band”, its position at higher latitudes moderates its sensitivity to rain-on-snow events. Under normal years in the Priest Lake Basin, most of the streams’ peak runoff is associated with spring rains on a late spring snowpack. A long-term water yield study in nearby Benton Creek suggests that, while rain-on-snow events may occur in the basin during the late fall and winter, they are not normally significant channel-forming events. The spring rains falling in the basin are the stimulus for the peak spring runoff. Haupt (1968) concluded that spring peak flows in Benton Creek were linked more often to meteorological events (e.g. rain falling on snow) than to clear weather snowmelt.

Additional research has shown that causes of peak flows are also associated with less frequent mid winter rain on snow events and rain on spring snow events. In their research, MacDonald and Hoffman (1995) found that the water yield spikes from rain on snow events are usually higher over a shorter duration.

The mouth of the Upper West Branch drainage is about five miles northwest of the mouth of Benton Creek drainage. Given the physical proximity of the Benton Creek drainage to the Upper West Branch drainage, it is reasonable to assume that the seasonal water yield responses would be similar. The fact that the Upper West Branch is dominated by spring melt and not rain-on-snow events is documented by 14 years of field observations by the District Hydrologist, coupled with data support from two hydrographs (Priest River and Upper Priest River) on the Priest Lake Ranger District.

Peak stream runoffs within the Upper West Branch tend to occur in April and May; two thirds of the annual runoff occurs during April, May and June (Stage 1957). Mean monthly stream discharges tend to rise to a moderate peak in December, recede in January, rise again to a major peak in May, and then recede during the summer and fall months. According to the study by Stage (1957), there was considerable deviation from average stream flow regime from year to year. In some years, there was virtually no winter peak runoff, and in other years there were two winter peaks. The current water yield in the several of the Priest River basins is likely higher than it would be historically because of the high density of roads.

3.73c Existing Condition

1. Sediment Production and Delivery

The different landforms in the geographic areas have been characterized as distinct landtypes. Landtype mapping combines bedrock geology, surficial geology, landforms, soils, slope gradients, aspects, elevation, amount of rock outcrop or talus, presence of avalanche chutes, rain-on-snow zones and canopy cover.

Lands within the analysis area have many combinations of these characteristics, each with different implications for management. If a particular combination is abundant on the Forest and has management implications that are different from the other combinations, that combination is mapped as a landtype and assigned a unique code. Areas with moderate and high sensitivity ratings inherently have a greater influence on watershed conditions than areas with low potential sensitivities because they more efficiently and directly affect water and sediment delivery. If management activities occur in these areas, mass failures or surface erosion are not certain to occur. Rather, the landtypes are used to indicate areas where more careful planning and use of mitigation measures or restoration are needed to avoid or reduce resource impacts.

Figure H-18 in Appendix H displays the mass failure potential ratings within the cumulative effects areas using these landtypes. Figure H-19 displays the sediment delivery potential ratings.

The majority of the analysis area contains soils that have a low sediment delivery and low mass failure potential. Within the analysis area are pockets of areas with a moderate or high sediment delivery and/or mass failure risk. Both sediment delivery potential and mass failure ratings tend to be higher on landforms dissected by streams. The effects of existing roads or proposed treatments on these areas are addressed in this analysis.

Results from WATSED modeling and the amount of activity and reduction of risks on sensitive landtypes are used as indicators for the potential for production and delivery of sediment. The existing condition for these indicators is contained in the table 3-20.

While interpreting the sediment yield increase above natural, it is important to consider that WATSED assumes that a road prism stays open and maintained in perpetuity and continues to generate a base level of sediment. In reality, many of the roads in the project area are heavily revegetated, which greatly reduces actual surface erosion. For this reason, the estimates of sediment yield increase above natural are somewhat overstated by the model results. Also, a road that is revegetated can still be a concern if it intercepts, concentrates, and re-routes substantial amounts of ground water and if it increases the natural potential for mass erosion. Therefore, it is best to use the sediment yield increase estimates as a relative indicator of sediment regime alteration rather than taken as an absolute.

The existing conditions for WATSED values for the larger Upper West Branch drainage suggest that annual sediment yields are about 155 percent above natural. (WATSED values for all drainages are located within the project file). The greatest increases sediment yields are linked to the intensive harvesting and roading that occurred in the 1970s and 1980s. As discussed in the previous paragraph, the WATSED estimates are often overstated, and their real usefulness is as a relative indicator.

Table 3-20: Existing values for Sediment Yield, Water Yield Peaks and Percents of drainage by Moderate and High Sediment and Mass Failure Risk Factors.

Watershed	Total Acres	Existing Percent over Annual Sediment Yield	Existing Percent over Natural Water Yield Peak	Percent of watershed with Moderate Mass Failure Potential	Percent of watershed with Moderate Sediment Delivery Potential	Percent of watershed with High Sediment Delivery Potential	Miles of Road on Landtypes with Moderate Mass Failure Potential	Miles of Road on Landtypes with Moderate to High Sediment Delivery Potential
Upper West Branch	45,377	155	6	35	32	13	126	175
Blonc	685	139	3	26	50	28	2	5
Consalus	4,081	205	4	36	62	11	15	16
Galena	2,020	251	9	48	50	11	9	9
Goose	14,009	192	5	27	52	25	22	35
Klahowya	1,562	153	5	38	28	10	4	4
Lower Goose	1,063	NA	NA	39	34	37	2	5.3
Lower UWB	10,566	131	9	29	28	9	22	43
North-eastern face Tributaries	608	127	14	48	54	0	3	4
Middle UWB	4,332	282	7	36	37	11	21	26
Solo	3,276	237	9	39	30	9	12	12
Tola	1120	82	8	27	25	8	2	2

Note: numbers are rounded to the nearest whole number.

2. Water Yield Increases

The WATSED model was used as a tool to estimate relative water yield changes over time within the Upper West Branch Drainage. The model estimates suggest that currently the water yield in the basin is about seven percent over natural conditions. This value seems to correspond to the existing condition within the basin that was documented in field surveys.

In the analysis area, the field survey data (stream and road surveys in project file) and field reviews by the project hydrologist suggest that, while the streams are able to handle the current water yield regime, there is a concern that the high density of roads is redistributing water across the landscape and inhibiting groundwater recharge. The relatively high-density road network within the analysis area tends to cause the spring melts to peak a bit more quickly and higher than would occur if the roads were absent. Similarly, the roads can act as artificial impediments within the streams and, in some instances, crossings may fail because the amount of water moving down the slope exceeds the ability of the culvert to pass the water or bedload. Though major road failures are relatively rare within the analysis area, there is the potential for this type of failure to occur given the current conditions of the roads, ditch lines and culverts.

3. Sediment Risk Associated with Road Drainage Crossings

Road drainage crossings have a limited life span and capacity. When stream crossings fail, large amounts of road fill can be directly delivered to streams, detrimentally affecting water quality and habitat for aquatic organisms. The sediment can come directly from the throughfill over the crossing or from the road prism in cases where the culvert failure diverts all or a portion of stream-flow down along sections of the road prism or ditch line (Furniss et al. 1997, Furniss et al.1998). These types of events can scour the receiving channel bed and banks, adding to the total sediment delivery. Several crossings in the Upper West Branch drainage are undersized and/or are not currently maintained.

Risk at stream crossings is managed by reducing the probability of failure, and the cost (in terms of sediment delivery) if a failure were to occur. Many of the culverts in the project area were surveyed over the summer of 2002 by fisheries staff of the Idaho Panhandle National Forests. The data were not available for review at the time of this report. Despite the lack of available data, we know that certain culverts (i.e. Road 2730 and Consalus Creek) are problems (i.e. fish blocks and/or undersized), and that opportunities exist to improve the situation.

Almost all of the roads in the Upper West Branch drainage were built or improved between 1930 and 1980. Therefore, many of the drainage relief culverts and stream crossings are 20 to 90 years old. The designed life expectancy for culverts is typically 20 years. This increases the need for and importance of upgrading existing road improvements. Some facilities were replaced as a result of damages incurred from climatic events in 1974, 1985, 1996 and 1997, but even pipes installed in 1985 are now nearing the end of their expected service life.

Occasionally, mass failures within the Upper West Branch drainage initiate on road prisms. Normally these “cut slope failures” are relatively small. They originate on roads rather than in harvest units. Most of these failures average about 10 feet high and 10 feet wide.

One example of a recent mass failure occurred in the spring of 1998, when managers discovered a relatively large mass failure on Road 1308 that was triggered by the high spring runoff. The failure was about 75 feet wide and ran down about 200 feet into an old cutting unit. Another mass failure was discovered in the fall of 2000 in the vicinity of Road 336H. This failure was about 50 feet wide and 300 feet long and did reach a stream. Road 336H was obliterated the following year and the slide was stabilized. The cause of these failures was water running down the road prism (Davis 1999). This runoff further super-saturated existing fills that were already weakened because of decomposing slash in the road fills.

The scale of these two failures is unusual in the Upper West Branch, as evidenced by historic reports and the inherent risk of future mass failures in the watershed. Still, attention needs to focus on removing those fills that were improperly constructed with slash. These older fills with decomposing slash elevate the risk of future mass failures in the basin. Field surveys conducted in 2003 found several existing roads that are at higher risk for failure. Two typical roads that were found to be at risk were Roads 1075J and 1075M. Both of these roads were surveyed (Lorentzen 2003) and found to have saturated fills and/or active slumping.

In addition to the introduction of sediment, stream crossings can also act as barriers to fish migration by creating velocities or jump heights that are too high for fish to pass. This type of fragmentation and disruption of habitat will lead to problems for populations and ultimately increase the risk of extinction (Rieman and McIntyre 1993). Similarly, delivery of sediment to streams from other sources can fill in habitat such as pools that are used by fish, and can fill in the spaces between gravels, cobbles and boulders in the streambed, which are used by rearing juveniles and a variety of aquatic organisms.

Road surveys documented a few undersized and/or plugged culverts along with fish barrier culverts within the analysis area. The field data sheets are located in the project file. Opportunities to improve these situations are discussed in Chapter II of this document.

3.73d Fisheries

1. Threatened and Endangered Species

a. Bull Trout

Bull trout, listed under the Endangered Species Act as a threatened species, are known to reside in the Priest River Basin, which includes the Upper West Branch (UWB). Bull trout in the lower Priest River appear to be only migrating into Priest Lake or East Fork Priest River (personal communication, Ned Horner, IDFG). The only known spawning population of bull trout in the lower Priest River is in East Fork Priest River.

Habitat Requirements

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 the species' distribution and abundance (Jakober 1995, Rieman and McIntyre 1993, Pratt 1985).

Stream channel equilibrium (stability) is the balance between sediment yield, water yield and channel morphology 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, Fraley and Shepard 1989) 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 might be the result of their dependency upon deeper water habitats. Maintaining lateral and instream habitat complexity, in association with channel stability, can best provide persistence of bull trout over time (Karr and Freemark 1983, Karr and Dudley 1981, Gorman and Karr 1978).

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 Celsius (ranging from 3 to 6 degrees Celsius) and should equate to ground water temperatures of about 5 to 10 degrees Celsius (Meisner 1990). Water temperature can be strongly influenced by land management activities (Henjum et al. 1994).

2. Sensitive Species

a. 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) (USDI 2002), although this species was recently determined "not warranted" for listing.

Cutthroat trout were identified during electrofishing surveys in 2003 in the mainstem Upper West Branch above the confluence with Sockwa Creek and in Solo Creek.

Habitat Requirements

The preferred habitat of westslope cutthroat trout is in cold, clear streams with rocky, silt-free riffles for spawning and slow, deep pools for feeding, resting and over-wintering (Reel et al. 1989). Pools are a particularly important habitat component, as cutthroat trout occupy pool habitat more than 70 percent of the time (Mesa 1991). Other key features of westslope cutthroat habitat are large woody debris (LWD) for persistent cover and habitat diversity and small headwater streams for spawning and early rearing.

A population status review of westslope cutthroat trout in Idaho previously determined that populations in northern Idaho have declined over their historic distribution, with viable populations existing in only 36 percent of the original Idaho range. The primary cause of the decline was found to be habitat degradation (Rieman and Apperson 1989). Since that review, a substantial number of new field studies that provided abundance data have been initiated in Idaho westslope cutthroat trout habitats. Additional waters are being managed with restrictive fishing regulations, and there has been considerable effort directed at maintaining and improving habitat conditions. More recently, a population status review of westslope cutthroat trout in the United States has determined that populations in Idaho have declined; however, they currently occupy over 18,000 stream miles (95 percent of historical distribution) in Idaho (Shepard et. al. 2002).

b. Torrent Sculpin

Torrent Sculpin were added to the Idaho Panhandle National Forests' sensitive species list on March 12, 1999. It is unknown if torrent sculpin inhabit the Upper West Branch Priest River; however, presence of torrent sculpin is likely because of the large size of the creek. Torrent sculpin 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 a cold-water species; consequently, its range overlaps with both of these species. Analyzing effects on westslope cutthroat trout will cover possible effects to torrent sculpin.

3. Reference Conditions

a. Fish Habitat

The reference condition for fish habitat is based on historic information, knowledge of basic ecological processes, and professional judgment.

Physical attributes of fish habitat are mainly defined by stream channel condition. The Upper West Branch Priest River geology is dominated by granitics. High road densities and past timber harvest have added to the sediment load in the Upper West Branch.

Fish habitat in the analysis area has been influenced by natural disturbance events and processes (e.g. historic fires) and human-related activities (e.g. logging and road building) as described above. The disturbance history of a system plays a large role in determining habitat conditions in fish-bearing streams. Within the analysis area, streams that are historic bull trout habitat and/or westslope cutthroat habitat are known or presumed to be fish bearing (see table 3-21 below).

Stream surveys completed in 1998 reflect high amounts of sand and sediment deposition in pool features. The largest substrate identified during the surveys was small cobble, although it was a very small percentage. Typically, over 50 percent was sand and gravel. The surveys also identified high entrenchment values for many of the reaches, likely related to bank damage from cattle grazing.

b. Fish Populations

The historic distribution of bull trout in the Upper West Branch is unknown, although local residents claim to have caught them in the 1950s and 1960s. Their current distribution is limited to the lower Priest River for a migratory corridor and seemingly random migrations into the Upper West Branch. It is possible that more habitat was historically available to bull trout. There are no known migration barriers on the mainstem Upper West Branch. However, the geology of the area has predestined the dominant substrate to be small diameter sand and gravel. In addition, temperature readings from fish surveys in late July 2003 average 15 degrees Celsius on the mainstem Upper West Branch (project file). Neither of these conditions is desirable for known bull trout habitat requirements. High road densities and past timber harvest have also contributed to habitat degradation. Competition with introduced species has likely degraded whatever historic population may have occurred.

The historic distribution of westslope cutthroat trout in the Upper West Branch watershed is unknown. Electrofishing surveys in 1996 and 2003 captured westslope cutthroat trout in the mainstem Upper West Branch and several tributaries, although the introduction of eastern brook trout and rainbow trout has likely depressed the cutthroat population.

4. Existing Condition

a. Fish Habitat

The Upper West Branch of the Priest River is clearly an alluvial channel. The majority of the mainstem is characterized as sand dominated with a stream gradient ranging from 1 to 2 percent. Recent stream surveys (see above in the watershed discussion) document that the channel has good access to its floodplains and that sediment and debris are deposited on the floodplain during high flow events. Large woody debris is adequate as both instream cover and pool formative features (project file).

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). Streams flowing off the sideslopes of the larger Upper West Branch drainage meet this description. In these channels, the dominant stream bank material is primarily composed of boulders, cobbles and bedrock outcrops that are not easily erodible. Plus, the channels are well confined and entrenched, which allows sediment and debris to be easily transported. These streams are relatively stable and are important for transporting sediment to the lower reaches.

There are no natural fish barriers within the lower two thirds of the Upper West Branch drainage. In earlier reports, Mission Falls was identified as a fish barrier. However, surveys conducted in 2002 and 2003 (Weidich and Carrothers 2002 and Cobb 2003) found that fish could easily pass through the falls, which were less than one meter high. In the headwaters of the Upper West Branch and in some of the smaller sub drainages, there are natural barriers such as natural rock chutes on Klahowya and Galena Creeks that restrict fish movement. In the project area, there are some possible unnatural barriers, including culverts and stretches of stream with elevated temperatures. A recent Forest Service survey conducted over the summer of 2003 inventoried many of the culverts within the Upper West Branch. The data are not yet available. When these data do become available, they will be used to prioritize repair or replacement of existing culverts that are fish barriers.

b. Fish Populations

Electrofishing during 1996 and 2003 field season evaluated fish species presence in the Upper West Branch. Thirty-two different sites were surveyed in the project area during the 2003. Six different fish species were captured: bull trout, westslope cutthroat trout, brook trout, longnose dace, sculpin, and one that was unidentified (table 3-21).

Threatened and Endangered Species

White Sturgeon - White sturgeon are not found outside the mainstem Kootenai River, which is outside the cumulative effects area for this project. This species will not be discussed further.

Table 3-21. Streams in the analysis area considered to be fish bearing.

Species	UWB	Klahowya	Tola	Solo	Galena	Consalus	Goose
Bull Trout	X**				X (FY 03)		
Westslope Cutthroat	X (FY 03)			X (FY 03)		X (FY 96)	
Eastern Brook Trout	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)
Sculpin	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)	X (FY 03)
Longnose Dace		X (FY 03)					

UWB = Upper West Branch X = confirmed presence of species
X* = presence not confirmed but is likely X** = presence not confirmed but is likely historic
(FYxx) = represents the most recent year the data were collected.

Bull Trout - Electrofishing surveys in 2003 identified a bull trout; however, additional surveys by the Kalispell Tribe Fisheries program failed to verify this information. Idaho Department of Fish and Game surveys and records have not documented any bull trout in the Upper West Branch. Anecdotal reports of bull trout sightings in the Upper West Branch have occurred from local residents; however, due to the proximity and lack of migration barriers, these are likely migrating, errant bull trout from the lower Priest River. The only known spawning population of bull trout in the lower Priest River is in the East Fork Priest River (personal communication, Ned Horner, IDFG).

Sensitive Species

Westslope Cutthroat Trout - Cutthroat trout have been identified in the Upper West Branch Priest River, although Idaho Department of Fish and Game records show no stocking in the Upper West Branch.

Torrent Sculpin - It is unknown if torrent sculpin inhabit the Upper West Branch; however, presence of torrent sculpin is likely due to the large size of the stream. 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 a cold-water species; 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 - Interior redband trout are not known to inhabit the Upper West Branch. Similar to westslope cutthroat and bull trout, the interior redband trout is a cold-water species; consequently, its range overlaps with both these species. This species will not be discussed further.

Burbot - Burbot are not found outside the mainstem Kootenai River, which is outside the cumulative effects area for this project. This species will not be discussed further.

3.74 Environmental Consequences

3.74a Methodology

As discussed in Chapter II, three factors were selected on which to focus the aquatic analysis: Sediment Production and Delivery, Water Yield Increases, and Sediment Risk Associated with Road Drainage Crossings. All of these items serve as indicators for measuring how the alternatives may impact water quality and ultimately fish habitat.

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 the Upper West Branch and its tributaries.

1. Sediment Production and Delivery

Percent increase in sediment yield is estimated as the annual sediment loading into the Upper West Branch above existing levels. This percent is compared to the current sediment load discussed in the affected environment section under the discussions of “Sediment Production and Delivery”. Sediment yield percent is calculated for each alternative using the WATSED model. The proposed timber harvest units, construction and reconstruction of temporary and classified roads, road maintenance and site preparation treatments are included in the analysis. Road obliteration and road storage efforts are not included in the WATSED modeling because the model is unable to estimate sediment delivery reductions and recovery periods back to natural conditions when roads are decommissioned or have become stabilized. 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 2010, the latest year that sediment yields stabilize.

2. Water Yield

Peak flows represent the change in runoff and is expressed as the percent change from the estimated "natural" peak month discharge. The WATSED model was also used for this analysis to estimate the effects of the proposed timber harvest, construction, reconstruction and site preparation treatments. Reasonably foreseeable actions are included in this analysis. Changes in peak flows are compared to the existing peak flows discussed in the affected environment section in the section titled "Water Yield". The estimated direct and indirect effects analysis timeframe for all alternatives is through 2020. This period is longer than the sediment yield since the water yield recovery period takes longer with vegetation regrowth.

3. Sediment Risk Associated with Road Drainage Crossings

This is the anticipated change in sediment risk associated with stream crossings that were inventoried within the scope of the project. The spreadsheet for this methodology was developed by Chris Savage, Zone Hydrologist and was used successfully for the West Gold EIS (Savage 2003). The sediment risk value was based on measurements or estimates of road through fill located at stream crossings, culvert size and stream characteristics (i.e. seasonal or year round flowing streams, channel gradient). This issue indicator is important in assessing watershed improvement work associated with the alternatives.

3.74b Direct and Indirect Effects

1. Alternative A

Since no management activities would be implemented with this alternative, there would be no direct effects associated with this project. Water and sediment yield values and trends as discussed in the affected environment would not change from existing conditions and predicted trends. In the mainstem of the Upper West Branch, sediment yield values would stay at about 153 percent above natural through 2015 and water yield peaks would gradually drop a current level of 6 percent down to 5 percent by 2015. .

Under this alternative, none of the identified at-risk road drainage crossings would be improved. Without the proposed improvements, the net associated risk of sediment delivery is estimated at a minimum of 4,910 tons[3] (watershed project file). The value of 4,910 tons is a minimum estimate. Many of the proposed pipe removals lacked site-specific data and thus conservative estimates were used to determine the minimum amount of tonnage that would be delivered if the culverts failed.

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[3] This is a minimum estimate. Many of the proposed pipe removals lacked data and thus conservative estimates were used to determine the minimum amount of tonnage that would be delivered if the culverts failed.

The roads that were included in this calculation included those roads determined to have the highest risk for failure (i.e. location on slope, sediment delivery potential and initial field surveys). The failure of these crossings could happen under one of three natural scenarios. First, if a large stand replacing fire occurs and is then followed by a high intensity rain or a rain-on-snow event. Second, if a rain-on-snow event were to occur as discussed in the affected environment section. Third, if a typical spring runoff occurred and debris plugged the culvert. Under any of these natural scenarios, culvert failures would occur should debris plug a culvert or if the capacity of the culvert was exceeded.

After a culvert is blocked or plugged, water then is either concentrated over the top of road fills or is diverted down the road or ditch. Often time, the failure leaves the road or ditch and moves onto hill slopes that are unaccustomed to concentrated overland flow.

As described above these projects would provide tangible benefits to the aquatic resources. The North Zone Geographic Assessment ranked this area as a relatively low priority for future funding in comparison to other watersheds on the Idaho Panhandle National Forest. Because of the relative low ranking, future funding for watershed restoration in the Upper West Branch is doubtful. Therefore, the most probable means of funding future aquatic restoration in this basin should be in conjunction with vegetative harvesting.

With either of these scenarios, the additional sediment pulse could result in adverse effects to fish populations. If either of these events were to occur while fish eggs or pre-emergent hatchlings were still in the gravels, they could potentially be entombed by the additional sediment and suffocate (Rieman and McIntyre 1993).

2. Effects Common to Alternatives B, C, and D

The majority of the proposed vegetation treatments under each alternative are focused in the lower third of the larger Upper West Branch drainage (see figures H-1 to H-3 in Appendix H). This area has relatively few streams and has relatively stable landforms. Alternatives B and C have almost identical vegetation prescriptions, but Alternative C treats 80 fewer acres and has no road building. Alternative D has about half of the proposed vegetative treatments but like Alternative B, it does propose road construction. Alternative D has little proposed treatment outside of the lower third of the Upper West Branch drainage. In Alternative D, there is no harvesting proposed in the Goose Creek drainage portion of the Upper West Branch.

a. Sediment Production and Delivery

Changes in sediment yield values for the three action alternatives over the term of the project are displayed in figure 3-2 and within the watershed project file. Logging and cutting prescriptions, temporary road construction and post-harvest activities are modeled. (The minimal increase in sediment delivery from the routine maintenance (blading) of the haul routes was recognized but not included in the modeling). None of the figures show the reduction in sediment from the removal and upgrade of the "at-risk" culverts, nor do they account for the obliteration and/or storage of roads. Recent validation WATSED 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 determine effects and is used as a relative comparison of alternatives. Because the model is used as a comparison tool, the results are presented in percentages rather than in absolute values.

To fully assess the impacts of the proposed activities, the WATSED model was applied to the smaller drainages. The terminus of each modeling effort was the confluence of that stream with a larger water body (i.e. the terminus of the modeling effort for the Upper West Branch was the stream's confluence with the Priest River). The majority of the subdrainages did not show a prediction of elevated responses (project file). The model's sediment and water yield predictions tend to be greater for the smaller drainages than in the larger drainages because the activities are concentrated in a smaller area.

For this analysis, the WATSED model was applied to the subdrainages as well as the larger Upper West Branch. The model results are presented for the larger Upper West Branch as well as the three drainages that showed elevated responses. The smaller drainages that showed elevated responses for sediment included: Tola, Tributary 1 of the Northeastern Face Drainages and the Lower Upper West Branch. Figures 3-2 to 3-5 show the responses and recovery of these drainages over time. Still, for the purposes of this exercise the model is useful as a comparison tool.

Effects of Sediment from Temporary Road Construction – In Alternatives B and D, temporary roads would be designed and planned as part of the transportation system then decommissioned after use. (No temporary roads or snowmobile trails would be constructed if Alternative C were implemented.) When a temporary road is no longer needed, then the slope stability would be restored, surface erosion would be eliminated by removing all temporary crossings and associated fills from the channel and floodplain and stabilizing the exposed soils with mulch and seeding. It is currently planned that no temporary roads would cross any perennial stream courses. These sites should need no major future maintenance after decommissioning, though there may be a need to treat noxious weeds for a few years after initial treatment. A random sampling of these roads post treatment would document the need for future treatment and/or success of the project.

Since Alternatives B and C are identical in vegetation treatment prescriptions, the differences in sediment yields are primarily attributed to temporary road construction activities and to a lesser degree, changes in logging systems. This is evident in the figures above where the darker gray colors for Alternative B represent elevated levels in sediment yield above harvest activities. This estimate of sediment is based on the deterministic nature of the WATSED model, which establishes sedimentation coefficients on road construction activities. The model does not incorporate buffer distances between roads and the nearest stream channel or the type and amount of storage material (rocks, coarse woody debris) within this buffer. These attributes are considered critical in estimating sediment delivery quantities from roads and other ground disturbance activities (Megahan and Ketcheson 1996, Elliott and Hall 1997).

Temporary road construction activities proposed in Alternatives B and D were developed to minimize possible increases in sediment delivery. For example, the temporary roads would only cross intermittent draws; the temporary roads would be located over 1,000 feet from the Upper West Branch; and each temporary road constructed would incorporate design features described in Chapter II under the sections discussing "Features Designed to Reduce Effects From Temporary Roads" and "Features Designed to Reduce Sediment". This is consistent with research findings that have shown when roads are designed with specific criteria and best management practices, they produce less sediment yields (Megahan et al 1992).

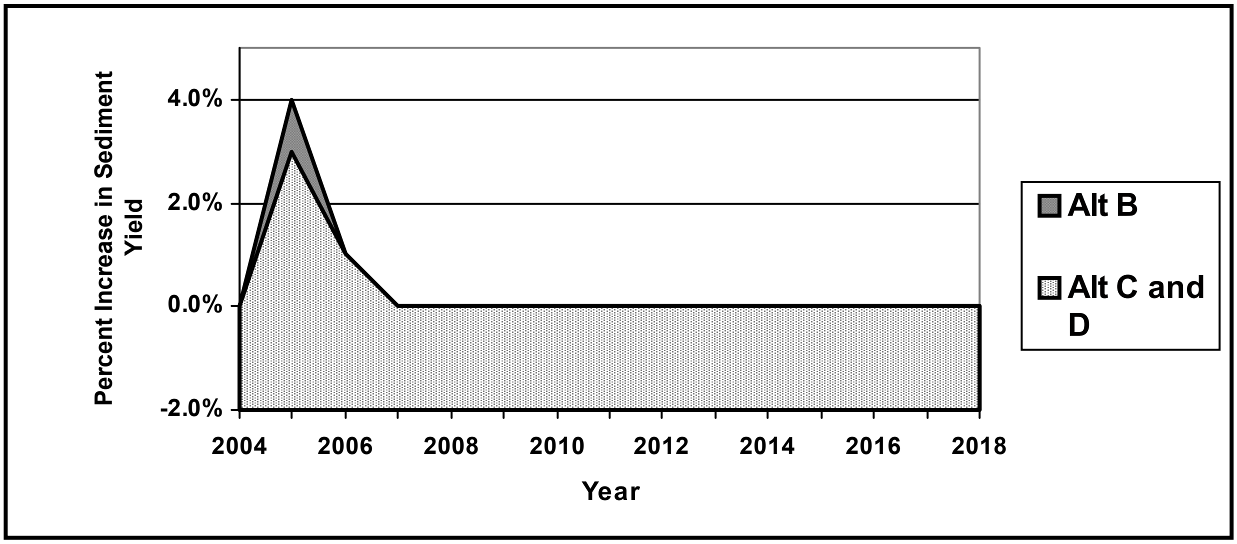


Figure 3-2. Alternative comparisons in sediment yield increases within the Upper West Branch. Differences between Alt. B, C and D are due primarily to temporary road construction and, to a lesser extent, differences in logging systems. Alternative A is not shown since it is assumed it would be a zero percent increase from the existing condition. Note: WATSED is not able to assess the elevated risk of potential culvert failures that were calculated separately and are discussed further in this chapter under the heading of "Effects of Sediment from Road Decommissioning".

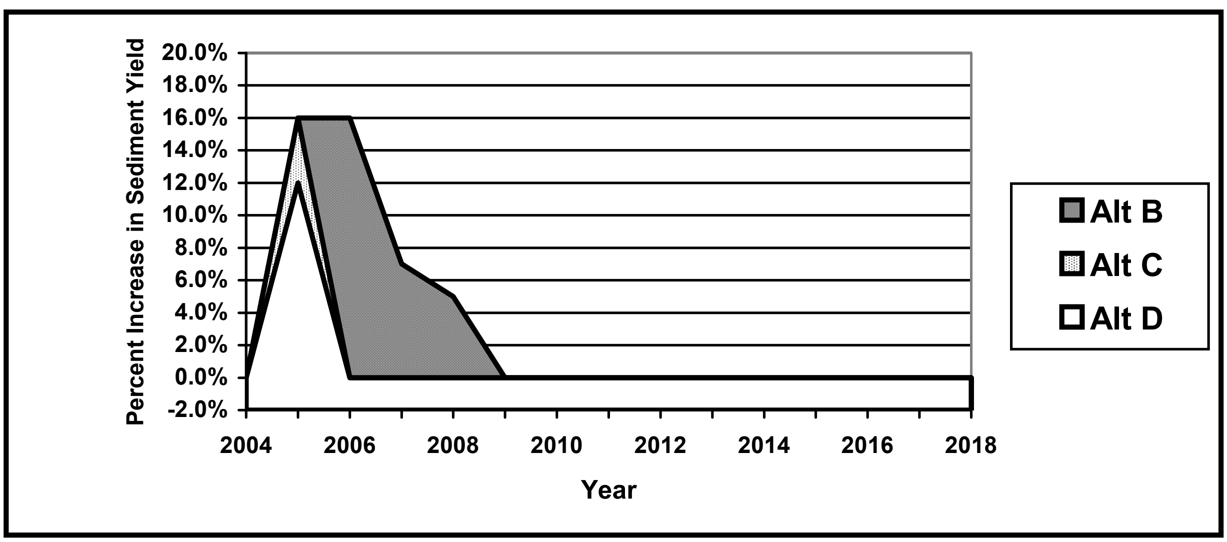


Figure 3-3. Alternative comparisons in sediment yield increases within the Tola drainage. Differences between Alt. B, C and D are due primarily to temporary road construction and, to a lesser extent, differences in logging systems. Alternative A is not shown since it is assumed it would be a zero percent increase from the existing condition.

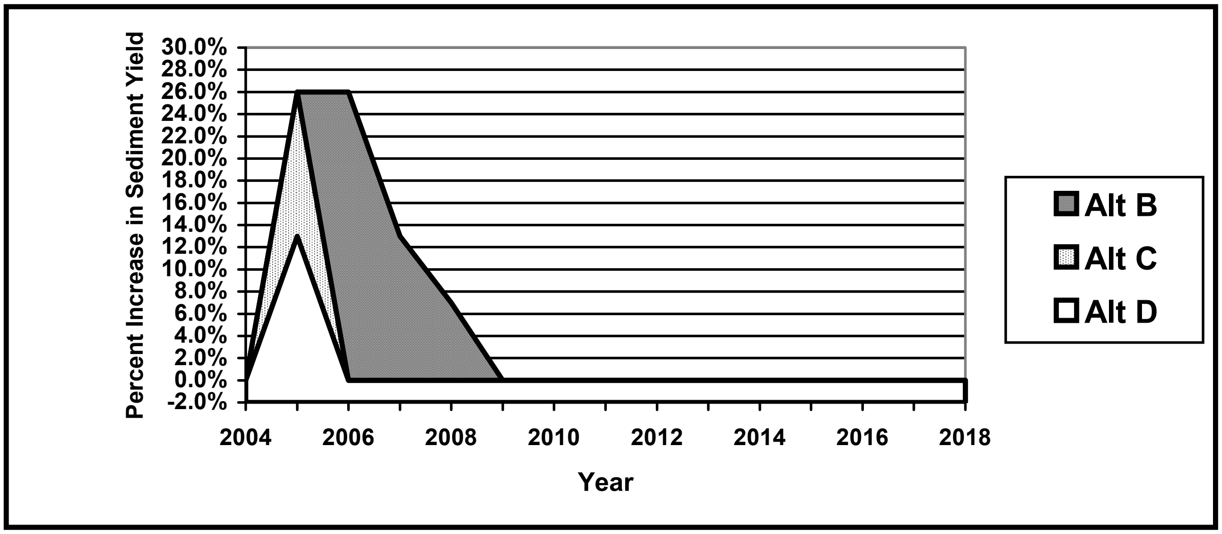


Figure 3-4. Alternative comparisons in sediment yield increases within the one tributary of the Northface drainages. Differences between Alt. B, C and D are due primarily to temporary road construction and, to a lesser extent, differences in logging systems. Alternative A is not shown since it is assumed it would be a zero percent increase from the existing condition.

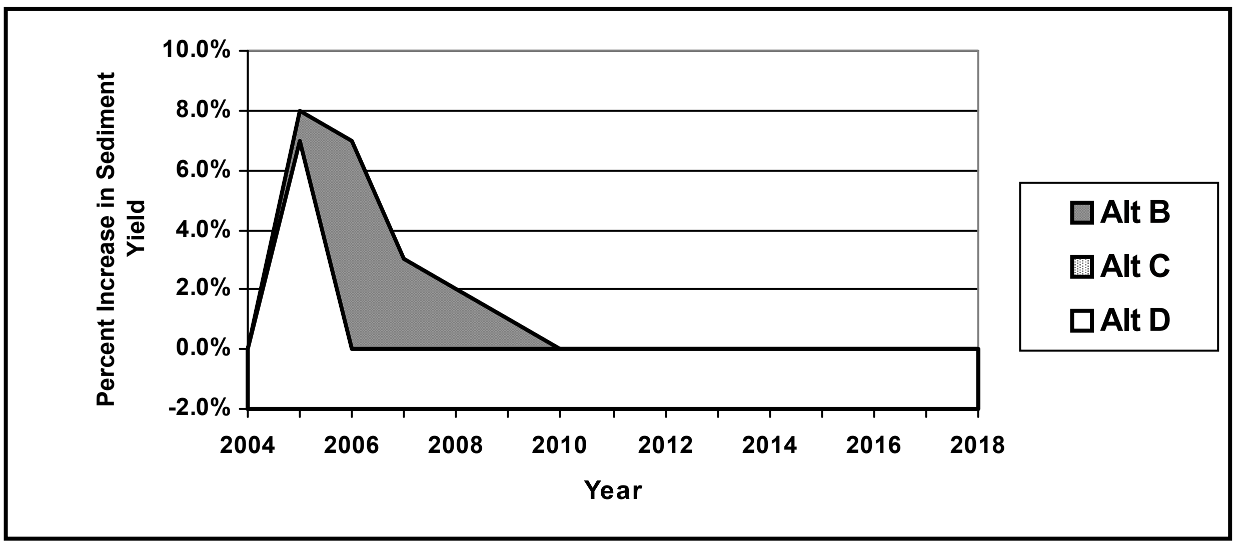


Figure 3-5. Alternative comparisons in sediment yield increases within the Lower Upper West Branch drainage. Differences between Alt. B, C and D are due primarily to temporary road construction and, to a lesser extent, differences in logging systems. Alternative A is not shown since it is assumed it would be a zero percent increase from the existing condition.

Typically, temporary roads remain on the landscape until all the associated timber sale site preparation and planting efforts are completed. The average time to accomplish these activities is 3 to 5 years depending upon weather conditions and access needs. Under the worse case scenario, temporary roads remain on the landscape for up to 8 years. Given the best management practices outlined in Chapter II along with the limited lifespan of these roads, it is apparent that the risk of sediment delivery from temporary road construction would be less than predicted under WATSED. Other projects that have modeled temporary road construction activities that incorporate buffer distances and sediment storage capacities demonstrate that sediment delivery rates are low (USDA 2002a). Table 3-22 displays the amount of proposed temporary road construction by risk of sediment delivery.

Table 3-22. Summary of temporary road construction on landtypes with a moderate or high risk of sediment delivery.

Alternative	Miles on Low Risk Landtypes	Miles on Moderate Risk Landtypes
Alternative B	2.12	0.29
Alternative C	0	0
Alternative D	0.26	0

Effects of Sediment from Routine Road Maintenance: As part of the typical timber sale, there is a contractual obligation for the purchaser to routinely blade the haul routes used by the logging trucks. While it is the preference of the USFS to not have the material side cast into the ditch lines, it does occasionally occur. When it does occur, then the purchaser should be obliged to remove the side cast to prevent its delivery to any stream. If the purchaser fails to remove the side cast from the ditch lines, then during a storm event, the sidecast that was deposited in the ditches can create a problem for aquatic resources. In extreme circumstances, the sidecast material accumulates in the ditch lines and can result in a road failure and massive delivery of sediment to a stream. More typically, the material moves through the ditch line and is delivered directly to a stream. The amount of sediment delivered to the stream through the ditch lines is relatively minor.

Effects of Sediment from Road Decommissioning/Storage - WATSED is unable to estimate sediment delivery reductions and recovery periods back to natural conditions with decommissioned or stored roads. Therefore, the long-term reduction in sediment delivery from the decommissioning and/or storage of 61.42 miles of road (26.52 miles of temporary roads and 34.9 miles[4] of classified roads) is not depicted in the model outputs.

To get an estimate of the amount of sediment reduction that we could achieve, we carefully assessed those roads that we knew or highly suspected had perennial or intermittent stream crossings. Roads that fell into that category included about 1/3rd of all the proposed road miles, or 18 miles. In those 18 miles of road, we identified 55 culverts. After reviewing the field notes and using conservative estimates where data were lacking, we were able to reasonably estimate the amount of sediment that could be reduced if these culverts were removed. The estimated amount of fill associated with the 55 culverts was 4,910 tons (project file).

It is important to recognize that this tonnage estimate did not include all of the roads proposed for treatment, but rather just those roads where we felt the risk of failure was most elevated. The roads that fell into a high risk category met one of more of the following: located on the middle to

[4] Calculations from Dan Jackson, Engineer 12-03-03

lower slope, field notes documented an existing problem, road was located on a landform with elevated risk of sediment delivery or mass failure potential, or there was a relatively high density of stream courses intersecting the road. The roads that were not modeled for tonnage estimates were either in lower risk areas or were candidates for abandonment with only minimal treatment.

Research has shown recovery of decommissioned roads within three to five years of the work (Hickenbottom 2001, USDA 2001, and Redente et al 1994). Under the worse case scenario, it is assumed that temporary roads will be on the landscape for eight years, so sediment delivery from temporary roads is estimated to recover to natural conditions in 2014.

Effects of Sediment from Logging and Vegetation Prescriptions - Activities occurring on sensitive landtypes consist of logging activities and slash disposal. There is no plan to treat vegetation on sites with high mass failure potential and there is no concern that mass failures would result from any of the proposed vegetative treatments. There is minimal ground disturbing logging planned on landforms that are highly sensitive to sediment delivery potential. The areas proposed for skyline or tractor logging on moderate and/or high-risk soils will be completed during the drier summer and fall months to avoid compromising supersaturated soils. The risk is elevated in these areas because of the proximity to streams.

For those units with more than an acre of elevated sediment delivery risk landtypes that are scheduled for logging with either log forwarder, skyline or tractor units, (6, 11, 12, 14, 15, 39, 40, 41, 48, 51, 53, 54, 55, 56, 58,71, 72, 73, 74, 76, 77, 78, 81), field surveys would be conducted prior to logging, or by default INFS buffers would be applied. In the event that field surveys are conducted, the aquatics representative would tailor the riparian buffers and best management practices to maximize the protection of aquatic resources. For example, if during a field review, the aquatic specialist determined that the prescribed buffer only minimally met the needs to protect aquatic resources, they would increase the riparian buffer and document their rationale.

It is anticipated that vegetation treatments on these sensitive land types would have minimal soil disturbance and specific timing restrictions (see Chapter II, Features Designed to Protect Soil, Water and Fish Habitat). Table 3-23 summarizes by action alternative the proposed logging treatment methods by high and moderate sediment delivery risk.

Sediment delivery rates from the proposed harvest activities on these higher risk land types are reflected in the WATSED sediment runs. The majority of these units would be skyline or helicopter logged and therefore would have minimal to no ground disturbance. Therefore, since there would not be any proposed logging or road construction within the RHCAs, the filtering ability of the buffer would remain in tact and thus sediment delivery from the proposed actions to any stream course would be minimal if it occurred at all.

Research studies and monitoring results conducted on the Idaho Panhandle National Forest verify that when RHCAs or buffer strips are incorporated into timber sales, sediment delivery to stream channels is not measurable or negligible (USDA 2000, 1999, 1998b, 1997b, Belt et al 1992, Reid and Hilton 1998). Past field reviews show that the dominant cause of the mass failures and resulting sedimentation to the Upper West Branch was abandoned and or inadequately maintained road networks rather than from timber harvesting.

Table 3-23. Summary of logging systems on landtypes with a moderate or high risk of sediment delivery

Alternative B	Acres on Moderately Sensitive Landtypes	Acres on Highly Sensitive Landtypes
Tractor	48	0
Skyline	214	6
Helicopter	92	3
Log Forwarder	87	6
Totals	**414**	**15**
Alternative C		
Tractor	48	0
Skyline	214	6
Helicopter	75	3
Log Forwarder	87	6
Totals	**424**	**15**
Alternative D		
Tractor	37	0
Skyline	109	5
Helicopter	11	0
Log Forwarder	87	6
Totals	**244**	**11**

b. Sediment Risk Associated with Road Drainage Crossings

All three action alternatives propose replacing or removing drainage structures that are at risk; therefore, all would reduce the potential for road crossing failures. Increasing the size of the culvert or removing the drainage structure would reduce the risk of failure. Table 3-24 displays which culverts are replaced and improved and the associated sediment risk reduction.

These culvert removals would eliminate the possibility of any delivery of sediment from culvert failures. If Alternative A were selected and the crossings were left in their current state, there would be an elevated risk for failure and sediment delivery to the streams. The risk is elevated because the undersized culverts would remain undersized and the risk of failure remain would remain high. The culvert improvements and removals identified in table 3-24 would reduce the net associated risk of sediment delivery to the Upper West Branch by at least 6,601 tons with the removal of 55 known crossings and an estimated 36 additional crossings on the remaining roads and potentially 1,125 tons with the improvements made to the roads listed in the above table.

There would be a short-term increase in sediment delivery during the removal or upgrading of the culverts, but sediment delivery would be minimized with prescribed timing restrictions, onsite direction, and application of the BMPs as outlined in Appendix A and in Chapter II Design Criteria (under "Sediment Reduction"). During the removal and/or upgrading of the culverts, there may be some "dirty" water that passes through the construction site despite preventative measures. Generally this dirty water is wash load fines and usually the turbidity subsides within a

Table 3-24. Net associated risk reduction in sediment associated with removing the 91 culverts and improving or replacing 15 culverts.

Road Crossing ID Number	Treatment	Reductions in Net Associated Risk (tons)[5]
Road 333	Extend current culvert with a 24 inch by 4 foot extension	75
	Install an 18 inch by 28 foot long culvert	75
	Replace old pipe with an 18 inch by 32 foot long culvert	75
Road 659 D	Install an 18 inch by 32 foot long culvert	75
Road 1075	Install new culvert inlet	75
Road 1075 J	Replace old pipe with an 18 inch by 40 foot long culvert	75
	Install drop inlet	75
	Install an 18 inch by 32 foot long culvert	75
1094	Install drop inlet	75
	Install an outlet extension	75
	Install an outlet extension	75
	Install an 18 inch by 40 foot long culvert	75
1094 B	Install an 18 inch by 40 foot long culvert	75
	Remove log culvert and replace with 24 inch by 40 foot long culvert	75
	Remove log culvert and replace with 24 inch by 40 foot long culvert	75
Proposed Road Decommissioning and Storage Treatments for road that have specific culvert and/or road data.	Calculated for 17.73 miles of road	4,910
Proposed Road Decommissioning and Storage Treatments for roads lacking specific culvert and/or road data	Estimated for 12.21 miles of road (estimated at 277 tons per mile of treatment) less reduced risk by 50%. The total estimate was reduced by 50% because these roads appear to have less of risk of failure than those roads that were assessed more specifically. This decision was made based on limited field data and the location of the roads on the landscape.	1,691
TOTALS		**7,726 tons**[6]

[5] Assumes average of 75 tons per crossing on each crossing at a system road. This is the average value of the calculated tonnage per crossing for the proposed culvert removals associated with the roads proposed for storage or decommissioning under the Chips Ahoy project. The project file shows the estimates generated by the spreadsheet that calculated the sediment risk associated with drainage structures.

[6] 7,726 tons is equal to 14,000 pounds or 187 5-gallon buckets filled with sand (assuming each bucket weighed about 75 pounds)

couple of hours depending upon weather. The limited discharge of dirty water does not adversely affect habitat, nor is it of enough concentration or duration to adversely affect stream biology.

There are far greater potential negative effects to water quality should culverts fail. Generally, a failed culvert delivers considerable bedload to the stream that can alter habitat and adversely impact stream biology. In summary, the removal or upgrades of culverts would have a long-term beneficial effect to aquatic resources over the existing condition by reducing the risk of bedload delivery to the streams.

3. Effects of Sediment Production and Delivery by Alternative

The following discussion focuses on the direct and indirect effect of predicted sediment increases for the four sub basins where the WATSED model estimated increases in sediment yields following implementation of an action alternative. The narrative is organized by alternative and sub drainage. The WATSED model predicted that the larger Upper West Branch, Tola, Tributary 1 of the Northeastern Face and the Lower end of the Upper West Branch would have increases in sediment yield. Discussion of direct and indirect effects analysis will therefore focus on these four drainages.

a. Alternative B

Direct and Indirect Effects on Sediment Increases in Upper West Branch: Implementation of Alternative B would have the highest estimated percent increase in sediment yield, with an estimated four percent increase for the first year of the project and recovery back to baseline within a year for the larger Upper West Branch. This amount of increase is not expected to occur because of the demonstrated effectiveness of the design criteria. Under this alternative, vegetation would be treated on 1,660 acres, 2.5 miles of temporary road would be constructed and 0.75 miles of snowmobile trail/road would be constructed. Over the life of the project, this alternative would generate an estimated 18.52 tons of sediment (project file).

Overall, there would be a net decrease of over 7,000 tons from existing conditions of sediment yield when considering the difference between the removal of the at-risk culverts and road decommissioning activities, and the sediment generated from the proposed activities. The net result would be an overall improvement in water quality.

Direct and Indirect Effects on Sediment Increases in Tola Drainage: Implementation of Alternative B would increase sediment yields by 16 percent above current levels according to the WATSED model predictions. This increase was attributed to treatment of 283 acres (65 of those acres were on moderate risk for sediment delivery potential). Focusing on the acres that would be harvested on soils with a moderated risk for Sediment Delivery Potential (SDP), 22 acres would be harvesting using a combination of tractor and skyline. The entire 22 acres is associated with proposed Unit 51. This unit is located on the northeastern side of the Tola drainage and there are no defined streams within the unit boundaries or within several hundred feet of the boundary. Given the lack of streams in, or near, unit 22, it seems very improbable that sediment would actually move off the site into streams.

The remaining proposed 43 acres of treatment on soils with moderate risk would be harvested with non-ground disturbing equipment. Improvements planned for the Tola Basin include long-term closure of 461C (1.5 miles) and road drainage improvements (e.g. grading, ditch and culvert cleaning) on the proposed haul routes. There are no temporary roads planned for the Tola drainage. The net effect of the proposed action would be a decrease in overall sediment delivery to Tola Creek and a gradual stabilization of the stream.

Direct and Indirect Effects on Sediment Increases in Tributary 1, Northface Drainage: Implementation of Alternative B would increase sediment yields by 26 percent above current levels according to the WATSED model predictions. With this action alternative, a total 130 acres would be harvested: 108 of those 130 acres are linked to a moderate sediment delivery potential. Approximately 128 of the proposed 130 acres of treatment would be harvested with either helicopter or skyline, both of which have minimal ground disturbance. In this alternative there are six proposed units located on soils with a moderate risk for SDP: Units 12, 13, 14, 53, 55 and 81. Two of these units are adjacent to the perennial stream draining this watershed. The two units close to the stream are Units 13 and 81. The logging system for Unit 13 is helicopter and for Unit 81 is skyline. Given that neither of these logging methods are ground disturbing and that INFS guidelines/buffers will be followed, there would be no delivery of sediment to the stream course from the proposed logging.

In addition to logging, this alternative proposes decommissioning almost one mile of Road 2292D and grading and stabilizing proposed haul routes. There are no temporary roads proposed for this drainage. The lack of sediment delivery, coupled with the reduction of current road based sediment sources, would be a net reduction in sediment delivery and therefore a net improvement to aquatics.

Direct and Indirect Effects on Sediment Increases in Lower Upper West Branch: Implementation of Alternative B would result in an eight percent increase in predicted sediment delivery the first year after implementation. This predicted increase would drop to pretreatment levels within five years. With this alternative, approximately 848 acres would be treated in this lower end of the Upper West Branch drainage. Of the 848 acres, 194 acres would be treated on sites with a moderate to high sediment delivery risk. Of the 194 acres proposed for treatment on sites with a moderate sediment delivery potential, 30 acres are proposed for harvesting with tractors.

The units proposed for tractor harvesting on moderate risk sites are Units 11, 55 and 56. All three of these units are located adjacent to an ephemeral draw that is located between Tola Creek and Tributary 1. The three units would all have INFS buffers; therefore the risk of sediment delivery to the draw would be reduced. Furthermore, given the elevated risk of sediment delivery to the stream, it would be within the guidelines of this document (Chapter II) to have a hydrologist (or representative) field review the units prior to logging to insure that INFS buffers are adequate and that that the logging system would be appropriated. This effort would support the agency's role in applying site specific Best Management Practices to prevent resource damage.

Given the INFS buffer strips and the site review, the risk for sediment delivery would be eliminated from these three units. In addition to the proposed timber harvesting, the agency would decommission several miles of road within this sub drainage. Some of the concentrated areas of road decommissioning would be found in the 1094 road complex, 1308 spurs and 1019 spurs. Removal of these roads would reduce some of the current sediment sources within this sub drainage. The net effect of the implementation of Alternative B would be a reduction in sediment delivery to the stream courses.

b. Alternative C

Alternative C does not propose any road construction, would treat 80 fewer acres than Alternative B, and would decommission the same miles of existing road as Alternative B. It would create an estimated three percent increase in sediment yield for the first year of the project and would recover to baseline conditions by the next year. The increase is less than Alternative B because there is no road construction associated with this alternative.

Over the life of the project, this alternative would generate an estimated 13.89 tons of sediment (project file). Overall, there would be a net decrease of over 7,000 tons of sediment yield from existing conditions when considering the difference between the removal of the at-risk culverts and road decommissioning activities, and the sediment generated from the proposed activities. As in Alternative B, implementation of Alternative C would result in an overall improvement in water quality.

Direct and Indirect Effects on Sediment Increases in Tola Drainage: The prescriptions for both alternatives B and C are identical for this sub drainage and would have the same effects.

Direct and Indirect Effects on Sediment Increases in Tributary 1 Northface Drainage: The prescriptions for both alternatives B and C are identical for this sub drainage and would have the same effects.

Direct and Indirect Effects on Sediment Increases in Lower Upper West Branch: The WATSED model suggests that sediment yield would increase by six percent above existing levels and then return to existing levels the year following treatment. The difference in responses between Alternative B and C result from differences in the proposed activities. No temporary roads would be constructed in Alternative C, and many of the Unit prescriptions were changed from skyline and/or skyline/tractor to helicopter logging. This change in logging systems along with the reduction of Unit 52 and the absence of road construction resulted in less of a sediment increase. Implementation of Alternative C would result in the same road decommissioning and storage as Alternative B. The net result of implementation of Alternative C would be a reduction in overall sediment to the streams contributing to the Upper West Branch.

c. Alternative D

Alternative D has less vegetation treatment than either of the other two action alternatives (see table 3-25 showing acres of prescription by alternative and drainage.). Alternative D would allow treatment on almost half the acres of either Alternatives B or C. However, like Alternative B, there would be some road construction. The construction of 0.3 miles of temporary road and the construction of the proposed snowmobile route at 0.75 miles are the primary causes in sediment increases. For this alternative, the increase in sediment yield was estimated at 3 percent and would recover back to baseline conditions by the next year.

Over the life of the project, this alternative would generate an estimated 13.89 tons of sediment (project file). Like the other two action alternatives, there would be a reduction of over 7,000 tons of sediment over existing condition resulting from the proposed road improvements and other road treatments.

Direct and Indirect Effects on Sediment Increases in Tola Drainage: The proposed treatment of vegetation under Alternative D differs from the prescriptions proposed for Alternatives B and C. Though the same number of acres would be treated, under Alternative D, almost 130 of the treated acres would only be burned and not logged. As in the other action alternatives, proposed Unit 51 (the unit with 22 acres of moderate risk sediment delivery potential) would be harvested. The effects of this alternative are the same as under Alternatives B and C.

Direct and Indirect Effects on Sediment Increases in Tributary 1 Northface Drainage: The proposed treatment with this sub drainage would include 67 fewer acres of treatment than Alternative B or C. There predicted increase in sediment yield would be 13 percent the first year, with complete recovery to pre-treatment levels by the following year. There would be no adverse effect to aquatic resources from this proposed treatment.

Direct and Indirect Effects on Sediment Increases in Lower Upper West Branch: Alternative D would treat approximately 272 acres fewer than Alternative B in this drainage. The primary difference between Alternative B and Alternative D is that, under Alternative D, there would not be any regeneration harvest. The change in harvest prescriptions resulted in fewer miles of road maintenance and fewer miles of temporary road construction.

The WATSED model was used to compare the effects of the differences in the two alternatives. According to the WATSED estimates, implementation of Alternative D would result in a sediment yield increase of seven percent above existing levels and the increase would return to existing within one year of treatment. This is one percent point less than the predicted increase for Alternative B. Alternative D would recover immediately, whereas Alternative B would recover after five years.

Under Alternative D, fewer miles of existing road would be maintained and fewer miles of temporary road would be constructed. The difference between the reduced road maintenance and reduced road construction would balance out. Therefore, in terms of sediment yield, the effects of Alternative D would be similar to those of Alternative B.

4. Effects of Sediment Production and Delivery on Fisheries

Increases in sediment delivery can affect fish habitat by filling in 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 removing wastes. 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.

Since all ground disturbing activities would occur outside of RHCAs under any action alternative, the risk of any sediment generated by logging activities actually reaching a live channel is very low (Belt et al. 1992). Due to the granitic geology of the Upper West Branch drainage, historically the Upper West Branch has likely had a large amount of sand and small diameter gravel in the stream channels and the resident fish populations have adapted under these conditions. High road densities and past harvest activities have elevated the sediment load to approximately 155 percent over reference conditions.

By using timing restrictions, onsite direction and BMPs, sediment delivery to occupied fish habitat associated with culvert removals and upgrades would be minimized. Additionally, 17.19 miles of road are scheduled for decommissioning, including the removal of 63 culverts.

Alternative B has the highest associated sediment yield increase of an estimated 4 percent in the short-term, and would trend back to baseline within three years (see figure 3-2. Alternative comparisons in sediment yield increases within the Upper West Branch show minimal differences between the action alternatives for the larger Upper West Branch drainage. The difference among alternatives is more pronounced in some of the smaller tributaries (e.g. Tola and Tributary 1).

In the event that any sediment was delivered to these drainages, that it is anticipated that most of these channels would assimilate the sediment and that the sediment would not measurably affect the form and function of the channels. The first order, higher-gradient channel types present in the tributaries to the Upper West Branch would likely transport any sediment to the nearest low gradient area where it would be captured. These sediments would likely remobilize during the next high water event and be transported even farther downstream.

Risk of sediment delivery and associated mass failure potential would be immediately reduced under any action alternative from culvert upgrades and removals and the sediment levels would trend back toward baseline in the long term.

5. Water Yield

Effects of Vegetation Prescriptions on Water Yield: The vegetation prescriptions for each of the action alternatives would begin to transition the stands to the historical vegetative conditions. In the Forest Vegetation Section of this chapter, table 3-4 displays the tremendous shift in tree species in the Upper West Branch that has occurred as a result of fire suppression, insect and disease. The intent of the much of the silvicultural prescription is to remove concentrations of Douglas-fir, grand fir and hemlock and replace them with more vigorous seral species such as white pine, larch and ponderosa pine.

Vegetative cover largely influences water yield within a drainage. Research has documented that climax species such as Douglas-fir use more water than seral species such as white pine. Given that much of the drainage historically had more seral species that grew in more open stands, it is logical to assume that water yields from the more seral-dominated slopes was historically greater than they are today. If the Forest Service were to decide to increase seral species and reduce climax species within this drainage, the resulting water yield would be within the historical range of variability. The amount of acres that would be affected by any of the action alternatives is relatively small compared to the total drainage. Proposed treated acres would range from two to four percent of the entire drainage. Table 3-25 displays the acres of prescription by alternative and drainage.

For the Upper West Branch, the difference in predicted water yield increases between the three action alternatives is one percent or less. The difference in water yield increases is numerically greater in the smaller drainages where the work is concentrated. Under Alternative B, Blonc, Consalus, Galena, the “lower” Upper West Branch, The Northface Tributary and Tola Creeks displayed increases greater than one percent. Under Alternatives C and D, there was no predicted increase in water yield in Consalus Creek.

There is essentially no difference in water yield increases between Alternatives B and C. However, Alternative D has a one percent lower increase than either Alternative B or C for the larger Upper West Branch (table 3-26). For the smaller drainages, the difference between Alternatives B and C as compared to Alternative D is greater. The difference is largely attributed to the lack of regeneration harvesting under Alternative D.

Each alternative would initiate a small increase in flows within the first order, headwater drainages. Increases in water yield under any of the alternatives would probably not be detectable in the main Upper West Branch channel and could not be differentiated from normal climatic fluctuations. These differences in water yield between the three action alternatives would not be detectable within the Upper West Branch and in the headwater drainages.

Table 3-25. Summary of prescriptions by drainage.

Drainage	Prescription	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)
Blonc	Seedtree	61	61	0
Consalus	Seedtree	151	151	0
Galena	Irregular Shelter wood	19	19	0
	Seedtree	68	68	0
Klahowya	Improvement Cut	22	22	22
	Irregular Shelter wood	11	11	0
	Seedtree	8	8	0
Lower Upper West Branch	Commercial Thin	108	108	108
	Eco Burn	32	32	32
	Improvement Cut	156	156	156
	Irregular Shelterwood	194	194	0
	Sanitation Salvage	182	102	182
	Seedtree	67	67	0
	Seedtree Improvement	11	11	0
	Shelterwood Improvement	98	98	98
Northface Trib	Irregular Shelter wood	69	69	0
	Shelterwood Removal	61	61	61
Middle Upper West Branch	Improvement Cut	18	18	18
	Irregular Shelterwood	1	1	0
	Seedtree	6	6	0
	Shelterwood Removal	1	1	1
Solo	Seedtree	33	33	0
Tola	Improvement Cut	52	52	52
	Improvement Cut/ Shelterwood	33	33	0
	Irregular Shelterwood	84	84	0
	Seedtree	12	12	0
	Shelterwood Removal	101	101	101
Totals*		**1,660**	**1,600**	**831**

*These totals differ from those in the alternative descriptions in Chapter II due to riparian buffers and to the discrepancies that sometimes occur when overlaying multiple coverages in Arc.

All three action alternatives are within the historic range of variability (HRV) for water yield. The maximum HRV was estimated by WATSED at 17 percent after wildfires in 1889 (project file), which is 10 percent higher than Alternatives B or C. Also, all three alternatives are within the HRV when comparing the difference in the rise of water yield from the existing condition.

As a result of the fires, the increase spiked by 17 percent in one year, whereas the predicted spike from existing under any action alternative would not exceed 1 percent in the mainstem and 7 percent in the smaller tributaries. During the 1889, 1926 and 1939 fires, the spike climbed from 16 percent, nine percent and five percent, respectively. The largest spike that would result from the implementation of any of the action alternatives would be with Alternatives B and C, which have a one percent spike, much less than what occurred from the fires.

Table 3-26. Estimated water yield increases (in percent) by drainage and alternative.

Drainage	Alternative B (percent)	Alternative C (percent)	Alternative D (percent)
Upper West Branch	1	1	0
Blonc	5	6	0
Consalus	2	0	0
Galena	2	2	0
Goose	0	0	0
Klahowya	0	0	0
Lower Upper West Branch	2	2	1
Northface Tributary	7	7	0
Middle Upper West Branch	0	0	0
Solo	1	1	0
Tola	4	4	0

All three action alternatives also mimic the recovery pattern that occurred naturally following the wildfires. From the fires, it was estimated that recovery gradually occurred over 20 years. This is the same pattern of recovery for water yield seen with the action alternatives (see project file for water yield values from WATSED Model).

Baseflows: The Upper West Branch drainage is underlain by an aquifer that supplies adequate water year round to the streams of the basin. Over the past three years, field observations have noted that while some of the highest headwater streams may become dry in the late fall months, the mainstem of the Upper West Branch and its tributaries have ample baseflow to support beneficial uses (J. Cobb, personal observation).

None of the proposed action alternatives would reduce baseflows in the stream channels. In fact, the proposed road obliteration and decommissioning across the basin may overtime incrementally augment the baseflows by minimizing surface runoff and by reducing the amount of sediment delivered to streams that may cause the streams to flow subsurface.

a. Stream Channel Morphology

Peak Water and Sediment Yields: 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 (Chamberlain et al 1991, Rosgen 1996). The Upper West Branch of the Priest River is clearly an alluvial channel. The majority of the mainstem is characterized as sand dominated with a stream gradient ranging from one to two percent. Recent stream surveys document that the channel has good access to its floodplains and the sediment and debris are deposited on the floodplain during high flow events.

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 (Chamberlain et al 1991, Rosgen 1996). Streams flowing off the side slopes of the larger Upper West Branch drainage meet this description. In these channels, the dominant stream bank material is primarily composed of boulders, cobbles and bedrock outcrops that are not easily erodible. Plus, the channels are well confined and entrenched, which allow sediment and debris to be easily transported. These streams are relatively stable and are important for transporting sediment down to the lower reaches.

All three action alternatives would modify the magnitude, intensity and duration of peak flows and sediment yields at different levels, with Alternative B causing the greatest change. Based on the stream channel and landtype characteristics of the Upper West Branch and its tributaries, the estimated changes in peak flows, sediment yields and the potential increases in flows from a rain-on-snow event would not affect stream channel morphology from any of the three action alternatives, and therefore would not change fish habitat. Though the mainstem of the Upper West Branch is an alluvial channel, it is functioning hydrologically and it would be able to assimilate the projected increases in water yields.

Goose Creek is also an alluvial channel. The increases in water yield from the proposed treatments could cause the channel to begin to resort limited areas of long-term bedload deposition (Benda and Dunne 1997). The resorting of the sediment would be a benefit to this stream that has excess deposits of sand. The result could be deeper pools and a tighter width to depth ratio. Those tributaries to the mainstem that are not alluvial channels are competent to manage the estimated increases in water yields without changing channel structure.

3.74c Cumulative Effects Analysis

1. Analysis Area

The cumulative effects analysis area is defined as the Upper West Branch watershed (figure H-17 in Appendix H). The 70.9 square mile watershed is the next scale larger that would exhibit any cumulative effects if they were to occur from the project.

2. Past, Present and Reasonably Foreseeable Actions

The following is a description of past, present and reasonably foreseeable actions, to establish the appropriate geographic and time boundaries for the cumulative effects analysis. Activities identified below were ones that are relevant to the watershed and fisheries cumulative effects analysis. Other activities listed in Chapter I are not discussed here because there is no soil or watershed disturbance created by these activities.

a. Past Activities and Events

Wildfires, timber harvesting and road construction activities have occurred throughout the watershed. This is discussed in greater detail in the affected environment section of this document. The effects of these past activities create the current conditions for this analysis and establishes baseline for comparison.

b. Present, Ongoing and Foreseeable Activities

Fire Suppression Activities - Over the last century, fire suppression activities within the Upper West Branch drainage has allowed stands to progress towards climax vegetative condition. The current trend is toward more shade tolerant species that are not as long-lived and are more susceptible to insects and disease (Forest Vegetation section). Since changes in water yield are associated with vegetation conditions, the existing and future trends would have an effect on water yield.

If successful fire suppression activities within the Upper West Branch drainage continue, then forest stands will continue to progress towards climax vegetation. As this occurs, peak water yield values will stay stagnant around six percent. Because of the constant (unchanging) water yield, the Upper West Branch and its tributaries will continue storing sediment in the channel in areas of deposition until an episodic event increases peak flows high enough to flush and entrain sediments (Benda and Dunne 1997).

General Motor Vehicle, Off Road Vehicle and Snowmobile Use on Roads – Given the increasingly popular use of these vehicles at Priest Lake, it is likely that we would continue to see an increase in recreational vehicle use in the Upper West Branch drainage. Since motorized use is not as restricted as other areas on the Forest, the increasing popularity from the Spokane area, motorcycles, ATVs and snowmobile use is increasing. This has forced additional needs in road and trail maintenance. The lack of road and trail maintenance causes increases in erosion and sediment delivery. Currently, road and trail maintenance has been reasonable in the Upper West Branch watershed and treatments are addressing the immediate concerns with erosion and sediment delivery (Cobb 2003).

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. These activities tend to deliver minor amount of sediment to the streams.

Activities on Private Lands within the Upper West Branch Watershed - Private land consists of 3.6 percent of the Upper West Branch watershed, with the majority of the land within or near the open valley known as Squaw Valley and Big Meadow. The private lands consist of mostly year round homes and several ranches. Some of the roads accessing the private lands are actively delivering sediment to Goose Creek and the Upper West Branch.

Timber harvesting is ongoing particularly near the confluence of Goose Creek and the Upper West Branch. Idaho Department of Lands has issued a permit for harvesting trees on private property in the Goose Creek drainage with the majority of the activity focused near Blonc Creek (watershed project file). Timber harvest activities must follow the rules and best management practices set by the Idaho Forest Practices Act (Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code). These rules and BMPs are designed to prevent sediment delivery to stream channels and to prevent any cumulative watershed effects.

The Department of Natural Resources for the State of Washington reported that the only timber harvesting occurring in the Washington portion of the drainage is 63 acres in the Goose Creek drainage. Current and ongoing activities on private lands are not anticipated to have any cumulative effects to watershed resources and aquatics because of it is assumed each activity will adhere to the Idaho Forest Practices.

Powerline Right-of-Way Maintenance – This activity will be ongoing and will increase after storm events that cause trees to fall onto existing powerlines. All activities will comply with the current special use permit. These activities are not expected to adversely impact aquatic resources.

Road Decommissioning and Storage - Currently there are plans to decommission roads within the larger Upper West Branch drainage. The two projects that are foreseeable are the Wats Moore Road Obliteration Contract and the Douglas Fir Beetle Road Obliteration effort.

The Wats Moore Road Obliteration Road Contract includes roads from across the Priest Lake District that were approved in previous NEPA documents for decommissioning. The roads that are in the contract that lie within the Upper West Branch drainage include Roads 336H for 6 miles and Road 336D for 2.1 miles. Both of these roads would be decommissioned in 2004.

In the Douglas-Fir Beetle Record of Decision (USDA 1999), a decision was made to decommission roads that were excess to the existing transportation plan. Field surveys conducted as part of the Douglas-Fir Beetle EIS effort documented that these roads were either actively contributing sediment to the streams were encroaching on the streams and adversely affecting the stream hydrology. Roads identified in the Douglas-Fir Beetle EIS, and the proposed road actions, are displayed in table 3-27.

Other roads discussed in the Douglas-Fir Beetle EIS that were to be closed by the purchaser include: 1.9 miles of Road 1108, 1.46 miles of Road 333G, 0.7 miles of 461CV and 2.14 miles of 1075F. The Chips Ahoy project proposes closing these roads through the purchaser as part of the timber sale contract. The effects of these road treatments are considered part of the existing conditions, since the decision was previously made in the Douglas-Fir Beetle EIS.

For both the Wats Moore and Douglas- Fir Beetle road projects, the proposed road decommissioning would follow established Design Criteria and Best Management Practices. These practices were determined to be highly effective at preventing sediment delivery to streams. It is recognized that during the course of operations, there may be some “dirty” or turbid water moving off of the construction sites. This dirty water is simply wash load and only lasts a matter of hours and does not adversely impact stream habitat or biology.

The effects of any short-term increases in turbidity from these projects would be much lower than the effects of the “real” sediment that is currently running off the road or that sediment which could be delivered to the stream if a culvert or road failed. The “real” sediment adversely affects the stream by changing the channel structure and causing long-term damage to aquatic species. As mentioned earlier, with the implementation of best management practices and design criteria, this roadwork should not result in any real sediment delivery to the Upper West Branch or its tributaries. Over the long term, there will be a substantial decrease in sediment delivery to the entire Upper West Branch watershed.

Watershed Improvement Work funded through Knutsen-Vandenberg Funds: In the summer of 2004, provided expected funding levels are maintained, the Priest Lake Ranger District will proceed with two watershed improvement projects within the Upper West Branch drainage: Buck Ranch road turnpiking and Tola Landing Rehabilitation.

Table 3-27. Roads identified in the Douglas-Fir Beetle EIS for storage or decommissioning.

Road	Miles	Proposed Road Actions (GIS miles)*				Number of Culverts
		S	D	OS	OD	
1108	1.60	0.88				12
1108B	0.62	1.08				8
1075K	0.56	0.53				6
1075N	2.60	0.64				4
1094D	1.96		0.30			4
1308H	1.97	1.41				7
1308HUA	1.25		1.36			2
1308HUC	0.55		0.55			3
2292B	1.83			0.80	0.11	4
312C	2.10	2.08				13
333G	1.46	1.49				3
461C	0.70	1.28				5
1075F	2.14	2.03				
1094A	0.52	0.66				0
1308G	0.40			0.37		0
2292C	1.14	0.98				0
Totals	**21.4**	**13.06**	**2.21**	**1.17**	**0.11**	**71**

*S = Storage, D = Decommission, OS = Storage that has been accomplished, OD = Decommissioning that has been accomplished.

The Buck Ranger road turnpiking project is located on Road 2730 in the vicinity of Goose Creek. Over the years, beaver have successfully created a wetland adjacent to the road. The intent of the watershed restoration project is to maintain the beaver dam and associated wetland while ensuring the safety of motor vehicles. The project will bring in gravel to turnpike the road and thereby raise the road prism out of the wetland while maintaining hydrologic processes. No adverse impacts to aquatic resources are expected from this project.

The Tola Landing Rehabilitation project is located in the lower third of the Upper West Branch drainage in the vicinity of the Northface drainages. Currently, the plan is to rehabilitate existing landings used during the Tola Timber Sale. At approximately 16 locations, landings will be deeply ripped, partially recontoured and revegetated. These landings are not adjacent to watercourses and thus there would be no delivery of sediment to any water bodies.

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.

Over the next five years, there is opportunity to precommercial thin about 500 acres over the basin. A map showing these activities is located in the Chips Ahoy project file. The unit sizes range in size from one to 56 acres. The average unit size is 15 acres and canopy removal is minimal. This activity would comply with INFS and therefore would not have a direct impact on aquatic resources. There could be a very limited, localized increase in water yield, but given the widespread nature of the proposed precommercial thinning, there would be no indirect effect to aquatic resources. Given there is no direct or indirect effect, there would be no cumulative effects to aquatics from the timber stand improvement activities.

Grazing – Grazing in the Upper West Branch has been ongoing for decades. The majority of the grazing has been concentrated in the valley bottom, though many of the headwater tributaries also have had extended periods of grazing. Currently, there are two allotments within the Upper West Branch drainage. The larger of the two allotments is located in the lower end of the Squaw Valley and is currently vacant until further NEPA is completed. The second allotment is located in the upper end of Squaw Valley has been vacant for the last couple of years, and there are no plans by the current permittee to put livestock out anytime soon (Teresa Catlin, pers.comm.11-21-03). The Forest Service has been working closely with this permittee over the past couple of years with noxious weed control and reseeding in some areas. To date, the effort has been very effective (Catlin, personal communication 11-21-03).

Both of the grazing allotments would be permitted only if the permittee agreed to comply with the rules and regulations governing the allotment; including but not limited to the IPNF Forest Plan, INFS Guidelines and the Bull Trout Strategy. Given the current guidelines associated with the allotment management, no adverse impacts to aquatics are anticipated. It is anticipated that private grazing lands within the basin will continue to be grazed and/or hayed.

Flat Moores and Tola Douglas-Fir Beetle Timber Sales - The residual work for the Douglas-fir Beetle is limited to fuel treatments for the Flat Moores Timber Sale. All site preparation has been completed for the Tola Timber Sale. According to Gary Weber (District Assistant Fire Management Officer), there is still a need to complete 23 acres of excavator piling and burning over the next two years. Additionally, as the weather allows, over the next two years, there is plan to under burn 70 acres for site preparation for planting. For specific locations of the proposed fuel treatments, refer to the project file.

There are no foreseeable increases in sediment delivery as a result of these activities. There could be a very slight localized increase in water yield from the burning. The increase in water yield beyond existing conditions would last about two years until the site is revegetated with brush and forbs.

Recreation - The District plans to continue annual maintenance of existing trails. The hydrologist will continue to work with the trail staff and volunteers to incorporate standard Best Management Practices into planning and implementation. On the following trails, there will be heavier maintenance:

- Squaw Valley Trail: Planned work includes drainage improvements and toilet installation at the trailhead.
- Icy Springs (#197): Relocate section of trail on Hungry Mtn to improve grade and reduce potential erosion problems.
- Squaw Valley (164): Construct minor relocations to reduce erosion problems.
- Kalispell Rock (103): Construct minor relocations to reduce erosion problems.
- Stateline (162): Construct minor relocations to reduce erosion problems.

- Chipmunk Rapids Loop (192): In a few areas of the trail, efforts will be made to reduce access by full sized motor vehicles and in others work groups will improve the tread of existing trails.
- South Baldy (104): Heavy maintenance is planned for this trail system. Recreation staff will work with the aquatic specialists to improve drainage on the existing trail. Efforts to improve the drainage would include installation and or construction of culverts, ditches, puncheon, waterbars, dips and turnpikes. This trail will continue to be maintained for motorized access.
- Tola Ridge (172): Continue to maintain to motorized / ATV standards. Install drainage structures as needed.
- Grouse Knob (198) and Mill Pt. (199): Both trails are in poor to nonexistent condition due to logging and road building activities and lack of maintenance. Both inventoried as motorized way trails. A need exists to improve the drainage structures and overall condition of these trails.

Quartz Mining - The district also has a large number of recreationists who actively dig for quartz crystals in the Solo Basin. The quartz digging has gone on for a number of years. The effort is focused in a specific perennial non fish-bearing stream that ultimately flows into Solo Creek. The disturbed area covers 15 to 20 acres and is heavily excavated by these recreational miners. In several instances, the miners have notably disturbed the channel banks and sediment is being delivered to the channel. This sediment moves down the channel and is gradually deposited behind natural channel obstructions prior to meeting the mainstem of Solo Creek.

In addition to the recreational quartz miners, there is a current permitted mining operation ongoing in the Solo Basin. The miner is extracting larger quartz crystal boulders. This activity is being monitored by the Forest Service to ensure compliance with the permit and to protect other resources. To date there is no adverse impact of this activity to aquatic resources.

3. Cumulative Effects

a. Sediment Yield

Present, reasonably foreseeable and ongoing activities that were determined to affect sediment include: Fire Suppression, Off Road Vehicle Use, Road Maintenance, Activities on Private Lands, Road Decommissioning and Storage, Cattle Grazing, Recreational Trails and Quartz Mining.

Not all of these activities would deliver equal volumes of sediment to the streams within the Upper West Branch. The Fire Suppression, Road Maintenance and Road Decommissioning would add negligible amounts of sediment to the streams and most would be in the form of short term (hours) of increased turbidity without the risk of changing channel morphology.

The other mentioned "Present, Ongoing and Foreseeable Activities" (Activities on Private Lands, Cattle Grazing, Recreational Trails and Quartz Mining) are contributing or have contributed enough sediment to the channels at discrete locations to the extent that channel morphology is affected. The Cattle Grazing and recreational trails have affected channel morphology in discreet areas (e.g. at locations where trails cross streams, or locations where cattle access the streams for water) with minimal effects up or down the channel. The "Activities on Private Lands" (e.g. riparian clearing and heavy machinery damage on the channel banks) and the Quartz Mining activities are causing indirect effects to channels downstream of the point of actual disturbance. In the case of the activities on private lands, the Forest Service is not able to change or influence the landowners causing the damage to the Upper West Branch. For the ongoing Quartz Mining, the effects of the mining are moving downstream but are not reaching any fish bearing waters.

Cumulatively, the sizable restoration efforts associated with the proposed actions would measurably reduce the current volume of sediment delivery to the Upper West Branch drainage. According to the direct and indirect effects analysis for the proposed actions, there would be no increase in net sediment delivery to the watershed. Instead, the combination of restoration efforts with the vegetation treatments would result in a net reduction of sediment to the Upper West Branch of over 6,000 tons.

Though some of the present, ongoing and foreseeable activities would increase sediment delivery to the Upper West Branch, the positive effects of the watershed restoration efforts would outweigh the sediment delivery. In summary, the combination of direct and indirect effects of the proposed alternatives with past, present and reasonable foreseeable activities, would result in an overall net decrease in sediment yield to the Upper West branch watershed. Table 3-28 summarizes estimated sediment inputs and reductions within the Upper West Branch drainage.

Studies have discussed that when disturbance patterns created by timber harvesting are used to achieve some of the benefits of natural disturbances, activities should be concentrated in a drainage rather than dispersed, that riparian areas need protection, and that harvest rotations should require longer intervals (Reeves et al 1995). The majority of the proposed vegetative treatments for the Chips Ahoy project are concentrated in the lower third of the drainage.

Table 3-28. Summary of estimated cumulative sediment delivery and reduction within the Upper West Branch Watershed.

Estimated Sediment Delivery (tons)	Alt A	Alt B	Alt C	Alt D	Comments
Chips Ahoy Project: **Estimated Sediment Addition (tons)**	0.0	18.52	13.89	13.89	Estimated delivery over the life of the project. Values include timber harvesting, temporary road construction, road maintenance, and post-harvest activities are modeled.
Chips Ahoy Project **Estimated Sediment Reduction (tons)**	0.0	-7,000	-7,000	-7,000	Sediment reduction is based on removal of road fill material from the at risk culverts.
Overall Net Sediment Reduction within the Upper West Branch Watershed (tons)	**0.0**	**-6,981**	**-6,986**	**-6,986**	

b. Water Yield: Increases in Peak Flows

With any of the action alternatives, the direct and indirect effects of increased peak flows, when combined with the effects from past, present and reasonably foreseeable activities, would not result in any cumulative effects to the Upper West Branch drainage. Present, reasonably foreseeable and ongoing activities that were determined to affect water yield include: Fire suppression activities, private logging and home development, road decommissioning and storage and fuel treatments in the Flat Moores Timber Sale. As was discussed in the “Present, Ongoing and Foreseeable Activities" portion of this section, none of these activities would independently or collectively measurably increase or decrease peak stream flows.

Estimated water yield increases obtained from the WATSED model are within the historic range of variability for magnitude, intensity and duration when compared with estimates for past natural events (figure 3-6). The effect of each of the action alternatives is consistent with what likely occurred with natural events. Since the proposed canopy-opening activities only account for 3.6 percent of the total area (National Forest Service Lands and Private Lands) within the watershed and the reasonably foreseeable activities would not significantly increase peak flows, the increases in flows from the proposed Chips Ahoy project would also be within the range of variability for the Upper West Branch drainage.

Figure 3-6 shows a comparison of the response of the drainage's water peaks to wildfire and compares that to the watershed's response to human activities. It is apparent from the model output that the water yield peaks did increase in response to the development of roads and the harvesting of timberlands. Still the increase attributed to the development of roads and timber harvesting did not reach the peaks of 16 and 17 percent that occurred in response to the historical wildfires. Therefore, it appears that the increase of seven percent as predicted under Alternative B would be well within the range of historical variability.

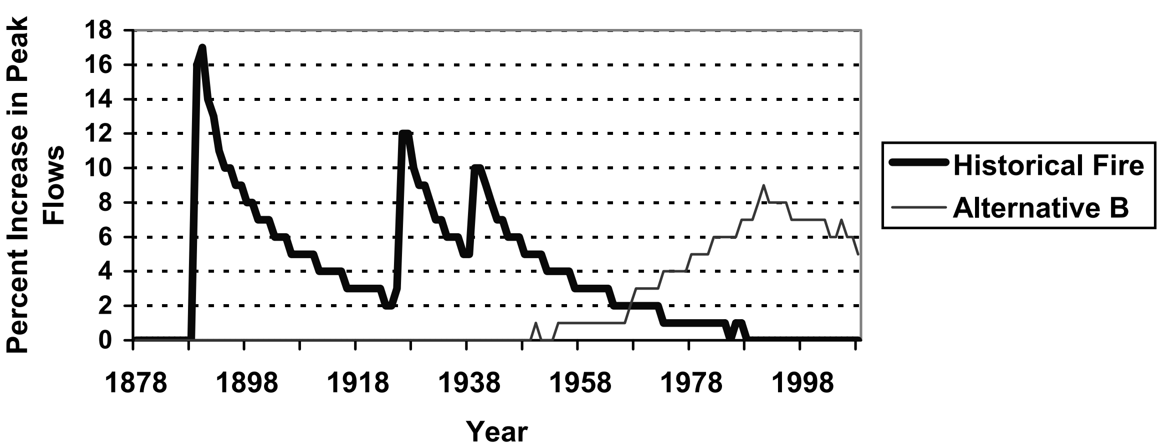


Figure 3-6. Historic water yields for the Upper West Branch.

Note the highest water yield peak for Alternative B was 7 percent. Also note that the WATSED model was run for the Historical fire assuming the fire was the major disturbance in the basin (No logging or roading was included in this model run). For the Alternative B model, the model began in 1932 and included from that year on all fire, roads and timber activities. Because of the sheer volume of data, the WATSED model was not able to run with the combined data of pre-1932 fires and all subsequent data. The graph gives some indication of the response peak water yields within the drainage as they relate to disturbances.

c. Effects to Peak Flows from Rain-On-Snow Events

In the event of a rain-on-snow event, the amount of incremental increase in peak flow increases predicted to result from this project would not cause any cumulative effects to the Upper West

Branch drainage. 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. The relatively small increase in peak water yields and increased opening sizes is not outside of the historic range of variability and therefore would not contribute to a heightened reaction to rain on snow. In fact, the planned removal of excess road systems within the basin should markedly improve the ability of the drainage to respond to future rain-on-snow events.

As discussed in the Affected Environment section, the greatest impacts observed from rain-on-snow events occur when culverts become plugged from resulting floods and debris flows. By improving or removing the high-risk culverts, the risk to a road failure is significantly reduced and net associated risk of sediment delivery would drop markedly. If undersized culverts are not replaced, or if debris plugs culverts or ditch lines, then the effect of a rain on snow event could be substantial within the Upper West Branch drainage or its sub drainages. It is reasonable to predict that there will be a rain on snow event within the basin that will result in considerable damage to one or more smaller sub drainages where road density is greatest and maintenance is not current.

Every rain on snow event is unique and the response of the drainage to the event depends of a variety of factors including but not limited to existing stream stability, condition of snowpack, duration of rain on snow event, vegetation height and density and condition of man-made infrastructure (e.g. Roads, culverts, bridges).

Of the aforementioned factors, the only one that the Forest Service can reasonably control is the condition of the man-made infrastructure. Since rain-on-snow events naturally occur, the stream has evolved to handle increases in water yield. Normal hydrologic processes such as flooding and redistribution of woody debris and bedload are typical stream responses to rain on snow events. During rain-on-snow events in the Upper West Branch drainage, the stream responds just like any other stream by flooding and moving debris and bedload.

The problems with rain-on-snow events occur when the man-made infrastructure becomes an obstacle to the event. For example, if a rain-on-snow event creates too great a runoff for a culvert to manage, the culvert will be overtopped and the road could fail. When this occurs, pulses of sediment are delivered to the stream, and the channel may not have the capacity to manage the extra bedload. The channel's response in those instances could be braiding or eroding a new channel. There is no conclusive way to prevent the occasional rain-on-snow caused failure as long as roads are kept on the landscape. The best option and the option that is being pursued with this project is to reduce the density of roads, upgrade undersized culverts and improve overall road maintenance. Given these efforts, the risk of a damaging rain-on-snow event would be reduced.

d. Cumulative Effects to Stream Channel Morphology

Effects to stream channel morphology are a function of the amount of predicted increases in sediment and water that could be delivered to the streams. The response to increases in water and sediment yield differs depending upon the stability of the receiving channel. As established earlier in the document, it is expected that net sediment delivery would decrease instead of increase. The decrease in sediment delivery to the streams would allow the streams to better sort the existing bedload and begin to stabilize.

The projected increases in peak water yields are minimal but they do exist. Still, the estimated peak flow increases are so minimal it is unlikely that any of the stable channels would experience channel incision or stream bank erosion. Furthermore, since the estimated increases in peak flows are within the historic range of variation (figure 3-6), there would not be any cumulative effects to changes in stream channel morphology in the stable channels.

As described in the affected environment, the Upper West Branch has ample large woody debris, deep pools, and an elevated level of sand as bedload. Most tributaries within the Upper West Branch are fairly stable, with well-vegetated banks, good width-to-depth ratios and a fair number of pools (see the Existing Conditions section).

In these stable streams, the estimated short-term increases in water associated with this project and road decommissioning are expected to be routed through the stream channels and would not be of a magnitude that would cause changes to stream channel morphology (e.g., migration, braiding, and widening of channels).

Two of the channels within the project area are currently not stable: Goose Creek and its tributary Consalus Creek. Under Alternatives B and C, seedtree harvest totalling 151 acres would take place within the Consalus Creek drainage. Similarly, for Alternatives B and C, 61 acres of seedtree harvest would occur in Blonc Creek, a tributary to Goose Creek. Blonc Creek was described as being stable in the Existing Conditions section of this document. The total amount of proposed timber harvest in the Goose Creek drainage would be limited to the total of 212 acres of seedtree harvesting. There would be no planned timber harvesting in the Goose Creek drainage under Action Alternative D.

Both Consalus and Goose Creeks are transporting elevated bedload (Cobb 2003). In Goose Creek, the channel structure was physically altered through trenching and straightening so that the channel is out of equilibrium and thus is inefficiently transporting existing bedload and accommodating peak stream runoff (see Existing Condition section).

The response of Goose Creek and Consalus Creek to increases in water yield would be different from that of the more stable streams. Although the projected increases in water yield from the planned seedtree harvests would be minimal, there would still be a response by the channel to increases in water yield peaks. Any increases in water yield in these drainages would accelerate the channels' efforts to try to reach equilibrium. As a result, the current ditched portion of the Goose Creek channel may increase to movement of existing sediment and increase the depth of existing pools. Additionally, sections of Goose Creek would become deeper and narrower as sediment is sorted by the stream flow. There would be a net a decrease in the width and depth ratio of the stream.

In Consalus Creek, the upper portion of the channel would respond to any increases in water yield by accelerating the movement of excess bedload out of the channel. Currently, the amount of bedload in the channel exceeds the channel's natural ability to function as a transport channel. This existing sediment would be deposited downstream of the lower gradient portion of the stream. In the downstream portion of Consalus Creek, where the gradient is markedly reduced, the channel's response would be similar to that described for Goose Creek.

For both the Consalus and Goose Creek drainages, the slight increase in water yield and subsequent changes in channel dynamics could be a benefit to aquatic resources that rely on these sand-dominated channels. The responses of Goose Creek to the minimal increases in water yield would not be detected beyond the confluence of Goose Creek and the Upper West Branch.

As established earlier, the Upper West Branch is transporting elevated levels of bedload. The implementation of any of the action alternatives and associated watershed restoration and road improvement work would reduce current levels of sediment delivery from National Forest Lands. With the implementation of any of the action alternatives, stream channel morphology in the Upper West Branch would be maintained and improved, since known sediment delivery sources would be rehabilitated and potential sediment sources would be eliminated through road decommissioning and storage.

e. Cumulative Effects to Fisheries

The Chips Ahoy project, in conjunction with reasonably foreseeable actions, would result in a short-term increase in sediment delivery, 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 actually reaching a live channel is very low. The modeled short-term increase in sediment yield directly associated with the project is primarily attributed to temporary road construction. However, given the proposed locations for the temporary roads, it is likely that actual sediment delivery values will be lower than modeled.

The potential short-term increase in sediment may impact individual westslope cutthroat trout and torrent sculpin, 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, if present, and are expected to benefit individual survival in the long term. Any increases in water yield would be localized and would not likely be measurable in fish-bearing channels.

3.74d Consistency with the Forest Plan and Other Regulations

1. Idaho Panhandle National Forests Plan

The Idaho Panhandle National Forests Plan states that "Management activities on Forest Lands will not significantly impair the long-term productivity of the water resource and ensure that State water quality standards will be met or exceeded" (USDA 1987, p.II-33). In application, this standard means that the IPNF will apply State water quality standards and Best Management Practices to land-disturbing activities to ensure that State water quality standards are met or exceeded and that projects that do not meet State water quality standards shall be redesigned, rescheduled or dropped. All water quality standards are listed on page II-33 of the Forest Plan.

All three action alternatives would be consistent with these standards. Proposed management activities would not impair the long-term productivity of the water resources and state water quality standards would be met or exceeded.

2. Water Quality Standards

As discussed in the "Regulatory Framework" section, the Forest Service is required to meet or exceed the water quality standards established by the State. In this instance, two States are considered under this project - Washington and Idaho. The States are responsible for ensuring that their standards meet or exceed the guidance provided by the Federal Clean Water Act. The standards consist of three principal elements: 1) designated uses, 2) criteria, and 3) an Antidegradation policy. The following narrative addresses the three principal elements and presents information that addresses whether the action alternatives would be consistent with the regulations.

a. Designated Uses.

Designated uses are often referred to as beneficial uses. Beneficial uses within the Upper West Branch include domestic water supply, salmonid spawning, coldwater organisms, irrigation, and recreation. The projected effects of any of the proposed actions would not adversely affect beneficial uses within the Upper West Branch. Implementation of any of the action alternatives would result in a net decrease in the total sediment yield within the basin. The minimal projected increases in water yield would not affect any of the beneficial uses with the exception of salmonid spawning and coldwater organisms. As described in the section on "Cumulative Effects to Stream Channel Morphology," there would be some shifts in the physical channel dimensions with the slight increase in water yield for Goose Creek and Consalus Creek and the mainstem of the Upper West Branch. As stated in that section, the changes in physical channel dimensions (e.g. deeper pools and deeper and more narrow channels) could actually be a benefit to existing salmonid spawning and cold-water organisms.

These changes would likely improve fish habitat by increasing complexity. Deeper pools would increase cover and overwintering areas and the resulting scour associated with any increase in water yield would deposit clean gravels on pool tailouts for potential spawning sites. The net decrease in sediment yield would improve survival of eggs and fry by reducing substrate embeddedness.

Criteria: The "Surface Water Quality Criteria" for the State of Idaho are set out in IDAPA 58.01.02.250, similarly the same criteria for the State of Washington are set out in WAC 173-201A-200. For the States of Idaho and Washington, the criteria provide guidelines for cold water that address dissolved oxygen, stream temperature, water chemistry, turbidity, and salmonid spawning. Given that there would be no effects to dissolved oxygen, stream temperature or water chemistry, the focus falls upon turbidity and salmonid spawning.

<u>Turbidity</u>: As discussed earlier, there would be some short-term increases in turbidity (dirty water) as a result of the culvert removals and routine road maintenance. The levels and duration of the predicted increases in sediment would not even come close to the exceeding the State of Idaho's criteria that limits turbidity levels to 50 nephelometric turbidity (NTU) instantaneous or 25 NTU for more than ten days. Nor would the activities exceed the State of Washington's criteria of not allowing increases of 5 NTU over background when existing NTUs are less than 50.

<u>Salmonid Spawning</u>: The projected effects to salmonid spawning were discussed previously in the section titled "Cumulative Effects to Stream Channel Morphology". The State of Idaho focuses the salmonid spawning criteria on desired levels of dissolved oxygen and ideal stream temperatures. As discussed earlier, the proposed actions would not alter existing dissolved oxygen or stream temperatures.

For Salmonid Spawning criteria for the State of Washington, the State's Washington Administrative Code considers the following criteria in determining whether the beneficial use (salmonid spawning) is protected: stream temperatures, dissolved oxygen, turbidity, dissolved gas and pH.

As discussed earlier, the proposed actions would not alter any of these parameters. By retaining intact RHCAs, there would be no reduction in canopy adjacent to the stream; therefore, there would be no increase in solar radiation to the stream and no associated increase in temperature. The net reduction in sediment delivery would reduce turbidity, by reducing chronic sources of sediment. Suspended sediment is associated with negative effects on the spawning, growth, and reproduction of salmonids (Bash et al. 2001)

b. **Antidegradation Policy:**

The Antidegradation policy is found in the Idaho Administrative code in IDAPA 58.01.02.051 and in the Washington Administrative code in WAC 173-201A-300. The Forest Service maximizes the use of Best Management Practices and Design Criteria during project implementation to further protect beneficial uses. The Forest Service has signed memoranda of understanding with both the States of Washington and Idaho to use the Antidegradation feedback loop. The Forest Service actively monitors the effectiveness of the prescribed BMPS and design criteria during the life of a project. If during the life of the project, a protective measure is not working as well as planned, then the Forest Service changes the practice to prevent damage to resources. This change in practices in response to challenges is the basis of the Antidegradation feedback loop.

For both States as well as the Forest Service, the intent of the Antidegradation Policy is to restore and maintain high quality surface waters. Implementation of the prescribed BMPS and design criteria and the use of the Antidegradation feedback loop would prevent adverse impacts to beneficial uses.

Draft 303(d) Listing of the Upper West Branch and Goose Creek: As demonstrated in this chapter, there would be a noticeable reduction in sediment delivery to the Upper West Branch and Goose Creek should any of the action alternatives be implemented. This reduction in sediment delivery would be a gigantic step in the right direction for reducing sediment as a pollutant of concern for this drainage.

c. Idaho and Washington Forest Practices Acts

Best Management Practices or Soil and Water Conservation Practices would be applied under all action alternatives, and all activities are in compliance with the guidelines in the Soil and Water Conservation Handbook. All state rules and regulations would be met and/or exceeded.

d. Clean Water Act

All alternatives would be consistent with the requirements of the Clean Water Act, 33 U.S.C. §1251. Risks to beneficial uses in the Upper West Branch drainage would not be changed by this project. In compliance with the draft TMDL status, there would be no net increase in sediment through management activities the Upper West Branch drainage.

In conclusion, the proposed actions would protect or enhance the beneficial uses associated with the Upper West Branch and its tributaries. All actions would be compliant with the federal Clean Water Act and the rules and regulations governing the States of Idaho and Washington. All alternatives meet the requirements of the IPNF Forest Plan for water resources and fisheries. Specific requirements and how this project meets them are listed in Appendix A (watershed) and Appendix B (fisheries).

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 Forest Plan, as amended by the Inland Native Fish Strategy.

3. Endangered Species Act

All alternatives meet requirements of the Endangered Species Act. The project may affect but would not likely adversely affect threatened bull trout, and would not jeopardize their continued existence. Critical habitat has not been designated for bull trout, and the Upper West Branch is not proposed as such.

4. National Forests Management Act – Species Viability

Fish species that may be affected by the project (westslope cutthroat trout) are also distributed across the Forest. Cutthroat trout currently occur in 100 percent of 4th code watersheds on the Forest. There is no connectivity between the Pend Oreille Lake watershed (which includes Priest River and Priest Lakes) and nine of the other 4th code HUC watersheds on the Forest (e.g., Kootenai River, St. Joe River).

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 Upper West Branch Priest River watershed), the Chips Ahoy Project would not affect viability of any threatened, endangered, sensitive, or MIS fish species on the IPNF.

5. Executive Order 12962

All alternatives are consistent with this executive order regarding aquatic systems and recreational fisheries. Short-term effects of implementation of one of the action alternatives 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.

6. 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 from implementation of one of the action alternatives are expected to benefit bull trout, if present, and their habitat (see Appendix B).

3.8 Adverse Environmental Effects Which Cannot Be Avoided

Implementation of any action alternative would inevitably result in some adverse environmental effects. Many adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of effects. The application of Forest Plan standards and guidelines, Best Management Practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity and duration of potential effects. Such measures are discussed in Chapter II.

Regardless of the use of these measures, some adverse effects will occur. This section focuses on unavoidable adverse effects from Alternatives B, C or D. Effects relating to Alternative A (the No Action Alternative) are disclosed in each resource section.

3.81a Noxious Weeds

Any activity has a risk of introducing and spreading weeds. Vehicle use and travel associated with timber harvest, road construction and other activities can increase the risk of spread. Mitigation measures such as washing vehicles and closure of temporary roads would help reduce but would not eliminate the risk of weed spread from proposed activities.

3.81b Aquatics

Road maintenance activities as well as temporary road construction for timber harvest could create sediment that would reach some stream systems during the short term, but Best Management Practices, site-specific design criteria, and use of stream buffers would reduce the effects to a minimal level.

3.81c Soil Productivity

Compaction and displacement can affect soil physical, chemical and biological properties, which can indirectly affect growth and health of trees and other vegetation. Some soils would be compacted during timber harvest activities; however, FSM guidelines (R1 Regional Supplement to FSM 2500) specify that no more than 15 percent of an activity area (i.e. cutting unit) will have detrimental impacts. Mitigation measures are designed so that activities meet these guidelines. None of the stands proposed for harvest activity would have existing compaction over Regional or Forest Plan standards.

3.81d Air Quality

Prescribed burning of slash and prescribed fires may cause a temporary reduction in air quality. No burning would be initiated during times when air quality restrictions are in place.

3.81e Wildlife

Removal of dead trees would reduce the amount of trees and snags available to some wildlife species, especially primary cavity excavators. However, the levels of snag and green replacement trees left would mitigate this adverse effect.

The harvest of trees would result in a direct loss of reproduction of some nesting birds. Other wildlife species may be displaced/disturbed during periods of human activity under the action alternatives.

3.81f Visuals and Recreation

Road construction, maintenance and log truck hauling would temporarily affect aesthetics and public use of the area.

3.9 Relationship Between Short-Term Uses and Long-Term Productivity

Short-term uses are generally those that determine the present quality of life for the public. Current activities must not impair long-term productivity. Long-term productivity of the land refers to its capability to provide resources such as forage, timber and high quality water.

3.91a Vegetation

The capability of the land to produce forage, timber and high quality water would not be impaired by the action alternatives. Silvicultural techniques that reduce competition and improve growth of individual trees, and other treatments to maintain the health and vigor of stands enhance the long-term productivity of the land to produce forest habitats and products. In the short-term, harvesting stands that are at high risk of mortality would use timber volume that would otherwise not be used for wood products. Timely reforestation would contribute to maintaining these lands in a productive state.

3.91b Aquatics

Under the action alternatives, road construction and decommissioning may temporarily increase a small amount of sediment to Upper West Branch. The long-term benefits of these activities would reduce the total potential volume of sediment entering the stream channel over time and would improve habitat conditions for fisheries.

3.91c Fuels and Fire Behavior

Timber harvest could affect both short- and long-term fuel loading. Harvest moves unavailable canopy fuels (tops, stems, limbs, needles) into available surface fuels. The risk of a crown fire may be reduced, but the risk of surface fires could be increased. An increased fire hazard and risk of ignition from activities such as recreation camping, vehicles, recreational hiking and machinery used in logging may result. Proposed fuel treatments would reduce some ignition risk over time and improve our ability to control fire.

3.91d Air Quality

Under each action alternative, the Forest Service would voluntarily cease burning activities when necessary to avoid violation of State air quality standards. Prescribed burning of fuels would occur primarily in early spring when demand for airspace has been historically low. Activities such as agricultural field burning, other forest residue burning on private lands, residential wood stove use, motor vehicle exhaust and dust from the Palouse and Columbia Basin are competing uses of monitored airspace.

3.91e Wildlife

The need for large snags for cavity nesters and perches, as well as down logs for hiding, denning and forage for other wildlife species over the long term, has to be weighed against the increased fuel loading presented by leaving large amounts of dead standing material or down wood. The number of snags to be left under the action alternatives follows a protocol based on the best available information on the appropriate size, numbers and species of snags are needed for wildlife and that can be protected during harvest activities. The short-term need for protection from destructive wildfire and reduction of wildfire risk has been addressed by fuels treatment proposals in the action alternatives.

The disturbance to wildlife and loss of security would be minor and short-term due to roads that are currently closed being opened to implement the project. These roads would have restricted use during the life of the project.

3.10 Irreversible and Irretrievable Commitment of Resources

Irreversible effects describe the loss of future options; these apply primarily to effects of using nonrenewable resources such as minerals or cultural resources, or to factors such as soil productivity that are renewable only over long periods. Irretrievable effects apply to loss of production, harvest or use of natural resources. The production loss is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume production (from FSH 1909.15-92-1, Definitions section 05).

3.101a Vegetation

The loss of production or use of natural resources can be considered an irretrievable loss. A low level of cutting of dead and dying trees in an alternative could be increased under future decisions, but dead trees not retrieved for wood products now would not be available in the future, and that output would be “lost”.

3.101b Soil Productivity

Harvesting a tree bole as a log could remove about 14 percent of the potassium within the tree, which may have an indirect effect on some plants. Potassium is recycled from the soil through green vegetation and is not added to the ecosystem by rainfall, air or other inputs. Effects of removing logs from low potassium soils are not entirely understood. Mitigation measures that call for retaining much of the fines and small stem material to overwinter on site would limit potassium removal.

Permanent road and landing construction cause irreversible effects to soil productivity since there is removal of the topsoil and compaction. These sites can only be restored after a long period of time or after ripping and revegetation. In small, localized areas of severe burning such as slash piles, there would likely be sterilization of soils.

3.101c Wildlife

The loss or modification of habitat for certain wildlife species is an irretrievable commitment of resources. This habitat will recover, but the timeframe for this to occur may be as long as several decades.

3.11 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 II and III where appropriate.

3.12 Other Required Disclosures

3.121a 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 Coolin and Lamb Creek, about eight and six miles respectively from the closest part of the project area. These communities were included in the releases of information to the public. While there are no specific demographic census data for these communities, data for Bonner and Pend Oreille Counties as of the 2000 census year show that the population is 93.2 percent white, not of Hispanic/Latino origin; 3.4 percent of Hispanic or Latino origin; and 2.0 percent of American Indian and Alaska Native origin. Black or African American, Asian, Native Hawaiian and Other Pacific Islanders each represent less than one 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. The implementation of this project is expected to provide job opportunities in communities within Bonner and Pend Oreille Counties and the surrounding areas. 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 Priest Lake Ranger District, none of the alternatives would substantially or disproportionately affect minority or low-income individuals, women, or civil rights. Some of the adjacent 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 income levels in Bonner and Pend Oreille Counties.

3.121b American Indian Religious Freedom Act

Consultation with the Kalispell Tribe of Washington is ongoing to determine if there are anticipated effects to their social, economic or subsistence rights.

3.121c 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.

3.121d Effects to Floodplains and Wetlands

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

3.121e 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.

3.121f Incomplete or Unavailable Information

The Forest Service and BLM are proposing to amend plans on 18 National Forests and 4 BLM administrative units to incorporate direction to manage Canada lynx habitat. A Draft EIS has been developed to meet the Purpose and Need of the amendment and to respond to primary issues. The Purpose and Need is to incorporate management direction that conserves and promotes the recovery of the Canada lynx, by reducing or eliminating adverse effects from land management activities on NFS and BLM lands, while preserving the overall multiple-use direction in existing plans.

The Northern Rockies Lynx Amendment DEIS was released in January 2004. The proposed action was designed with specific measured to protect lynx habitat and to comply with existing rules and policies. The design and implementation of the Chips Ahoy Project may be modified to comply with changes in Forest Plan direction as directed by the Lynx Amendment FEIS and Record of Decision.

The Northern Region of the Forest Service is proposing to amend National Forest Plans to incorporate direction to manage grizzly bear habitat. The US Fish & Wildlife Service issued a Biological Opinion on the amendment on February 10, 2004. A Record of Decision will be issued by March 10, 2004 on the Final EIS.

The proposed action was designed with specific measures to protect grizzly bear habitat and to comply with existing rules and policies. The design and implementation of the Chips Ahoy Project may be modified to comply with changes in Forest Plan direction as directed by the Grizzly Bear Amendment FEIS and Record of Decision.

Appendix A – Best Management Practices and Forest Plan Consistency

Site Specific Best Management Practices

PRACTICE 11.05 - Wetlands Analysis and Evaluation

Objective: Delineate wetlands within sale areas in order to prevent damage to facilities or degradation of soil and water resources.

Effectiveness: High

Compliance: FPA Rule 4.d.v(c) – Meets

PRACTICE 13.03 - Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows

Objective: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands, bogs and wet meadows.

Effectiveness: Much of this mitigation consists of avoiding the impact [40 CFR 1508.20(a)]. The Forest Service has near-complete control over construction operations. Effectiveness is expected to be high.

Compliance: FPA Rule 3.h.iii - Meets

Implementation: At a minimum, the following specific protective requirements for wetlands identified on the Sale Area Map (SAM) will be incorporated into CT6.61# (Wetlands Protection):

1. Soil and vegetation along lakes, bogs, swamps, wet meadows, springs, seeps, or other sources where the presence of water is indicated will be protected from disturbance which would cause adverse effects on water quality, quantity, and wildlife and aquatic habitat (FPA Rule 3.h.iii].
2. An equipment exclusion zone shall extend a minimum of 50 feet from the wetlands, bogs, and wet meadows.

PRACTICE 13.04 - Revegetation of Surface Disturbed Areas

PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

Objective: To protect soil productivity and water quality by minimizing soil erosion.

Effectiveness: Revegetation can be moderately effective at reducing surface erosion after one growing season following disturbance and highly effective in later years. Effectiveness has been shown to vary from 10 percent on 3/4:1 slopes to 36 percent on 1:1 slopes to 97 percent on 1:1 slopes in later years (King, John G. and E. Burroughs. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station General Technical Report, 1988).

Compliance: FPA Rules 3.d.iii & e.i, ii - Meets

Implementation: All temporary roads, landings, and skid trails in the sale area will be seeded within one year after harvesting is completed. Seed mixes and fertilizer specifications will be incorporated into Timber Sale Contract provision CT6.601# (Erosion Control Seeding). Timber Sale Contract provision CT6.623# (Temporary Road, Skid Trail/Skid Road and Landing) will identify that scarification/ripping of compacted landings and closed roads will be a minimum of 4 inches, not to exceed 2 feet.

a. All temporary roads, landings, and skid trails will also be fertilized to give the new plants extra support in becoming established.

b. The standard Idaho Panhandle National Forests moist site erosion control seed mix will be used.

PRACTICE 14.06 - Riparian Area Designation

PRACTICE 15.12 - Control of Construction in Riparian Areas

Objective: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

Effectiveness: Moderate

Compliance: FPA Rules 3.g.ii, iii, & iv; 3.f.iv - Meets

Implementation: Riparian areas will be protected through the following requirements that will be incorporated into timber sale layout, or into the timber sale contract as identified below:

1. Provide the large organic debris, shading, soil stabilization, wildlife cover, and water filtering effects of vegetation along Class I streams [FPA Rule 3.g.i-iii]. The following measure(s) are implemented during sale layout:

    (a) A Stream Protection Zone that consists of a buffer of 300 feet slope distance from the edge of the channel for Upper West Branch Creek. No timber harvest activities shall occur within the Stream Protection Zone.

    (b) A Stream Protection Zone that consists of a buffer of 100 feet slope distance from the edge of the channel for the intermittent tributaries to West Upper West Branch of Priest River. No timber harvest activities shall occur within the Stream Protection Zone.

2. Waste resulting from logging operations, such as crankcase oil, filters, grease and fuel containers, shall not be placed inside the Stream Protection Zones [FPA Rule 3.f.iv and TSC Provision BT6.34].

PRACTICE 14.11 - Log Landing Erosion Prevention and Control;

PRACTICE 14.12 - Erosion Prevention & Control During Timber Sale Operations;

PRACTICE 14.15 - Erosion Control on Skid Trails.

Objective: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

Effectiveness: Moderate

Compliance: FPA Rules 3.e.i, ii; 3.d.iii - Meets

Implementation: The following criteria will be used in controlling erosion and restoring landings and skid trails to minimize erosion:

General:

1. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations at least 100 feet outside of the appropriate Stream Protection Zone [FPA Rule 3.f.iii].
2. Skid trails and landings will be seeded with a mix specified in C6.601#.

Landings:

1. During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams.
2. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed [FPA Rule 3.e.ii].
3. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.
4. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain or spread [Provision BT6.63 (Landings)].

Skid Trails:

1. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross-draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff [FPA Rule 3.e.i].
2. The sale administrator and/or watershed specialist will designate the spacing of water bars on skid trails. [Reference FSH 7709.56]

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

Objective: To assure the adequacy of required timber sale erosion control work.

<u>*Effectiveness*</u>: High

Compliance: No directly related FPA Rule

Implementation and Responsibility: Timber Sale Contract provision B6.35 requires that upon the purchaser's written request and assurance that work has been completed, the Forest Service shall perform an inspection. Areas that the purchaser might request acceptance for are specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Timber Sale Administrators will not accept as complete erosion control measures that fail to meet these criteria.

PRACTICE 15.03 - Road and Trail Erosion Control Plan

Objective: To minimize the effects of erosion and the degradation of water quality through erosion control work and road design.

Effectiveness: Moderate

Compliance: No Related FPA Rule

Implementation: Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. Erosion control work to be done by the Contractor will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control work necessary for all phases of the project. The Engineer will certify that the Contractors Erosion Control Plan meets the specifications of Std. FS Spec. Section 204.

PRACTICE 15.07 - Control of Permanent Road Drainage

Objective: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

Effectiveness: Moderate. Designed and controlled ditches, cross drain spacing, and culvert discharge prevent water from running long distances over exposed ground.

Compliance: FPA Rules 4.c.viii; 4.d.iii(a) & (b) - Meets

Implementation: The following items will be included in the timber sale contract provisions or road contract special project specifications.

1. Drainage ways shall be cleared of all debris generated during construction and/or maintenance that potentially interfere with drainage or water quality [IFPA Rule 4(c)(ii), Timber Sale Contract Clause C5.4, and Standard Road Specifications-Special Project Specification 204.04].

2. During and following operations on out-sloped roads, out-slope drainage shall be retained and berms shall be removed on the outside edge except those intentionally constructed for protection of road grade fills [IFPA Rule 4(c)(vi) and Timber Sale Contract Clause C5.4].

3. Cross drains and relief culverts shall be constructed to minimize erosion of embankments. The time between road construction and installation of erosion control devices shall be minimized. Drainage structures or cross drains shall be installed on uncompleted roads which are subject to erosion prior to fall or spring runoff. Relief culverts shall be installed with a minimum grade of 1 percent [IFPA Rule 4(c)(viii) and Standard Road Specifications-Special Project Specification 204.1].

4. Cross drains and relief culverts will be installed so as to minimize concentrations of intercepted water (see also Practice 15.02 f.(3)).

PRACTICE 15.08 - Pioneer Road Construction

Objective: To minimize sediment production and mass wasting associated with pioneer road construction.

Effectiveness: Moderate

Compliance: No directly related FPA Rule

Implementation: The following contract specifications will be required:

1. Construction of pioneer roads shall be confined to the designed location of the road prism unless otherwise approved by the Contracting Officer (Std. FS Spec. 203.11).
2. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits (Std. FS Spec. 203).
3. Permanent culverts will be installed at wet crossings during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Stream crossing Projects

Objective: To minimize erosion of, and sedimentation from, disturbed ground on incomplete projects.

Effectiveness: Moderate

Compliance: FPA Rules 4.c.ii,iii,iv; & 4.d.iii - Meets

Implementation: The following measures will be implemented during projects:

1. Temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion will be installed as necessary. The removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossing causeways will be completed as soon as practical;
2. The removal of debris, obstructions, and spoil material from channels and floodplains;
3. Seeding with an erosion control seed mix approved for use on the Idaho Panhandle National Forests to minimize erosion.
4. Install drainage structures or cross drain uncompleted roads that are subject to erosion prior to fall or spring runoff. (Std Spec 204)

Erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material

PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

See also Practice 13.05

Objective: To insure that unconsolidated excavated and sidecast material, construction slash, and roadside debris, generated during road construction, is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

Effectiveness: High

Compliance: FPA Rule 4.c.iii,iv; & 4.d.i,ii,iii

The slash windrow and other erosion control devices will not be placed in existing stream channels or obstruct culvert outfalls. Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

Implementation: In the construction of road fills near streams, compact the material to reduce the entry of water, minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage.

Where slash windrows are not desirable or practical, other methods of erosion control such as erosion mats, mulch, and straw bale or fabric sediment fences will be used. Where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means.

The following standard specs will be included in all road contracts that include clearing and excavation.

1. Standard Specification 201 (Slash Treatment)
2. Standard Specification 203 (Excavation and Embankments)

PRACTICE 15.13 - Controlling In-Channel Excavation

Objective: To minimize downstream sedimentation by insuring that all in-channel excavations are carefully planned.

Effectiveness: High

Compliance: SCA Rule 9,1(a) - Meets

Implementation: Location and method of stream crossings will be designed and agreed to prior to construction. The following items highlight some of the principal provisions incorporated into the TSC that will govern channel protection:

1. Construction equipment may cross, operate in, or operate near stream courses only where so agreed to and designated by the Forest Service prior to construction (B6.5, B6.422). Crossing of perennial stream channels will be done in compliance with the specifications in the Stream Channel Alteration Act Rules and Regulations and included in the project specifications.

2. No construction equipment shall be operated below the existing water surface except that fording the stream at one location only will be permitted, and work below the water level that is necessary for culvert bedding or footing installations will be permitted to the extent that it does not create unnecessary turbidity or stream channel disturbance [SCA Rule 9,1 (a) and Standard Road Specifications-Special Project Specification 204.04].

3. Wheeled or track laying equipment shall not be permitted to operate within 5 feet slope distance of the apparent high water mark of Class II streams and 75 feet of Class I streams. (C6.6 Erosion Prevention and Control).

4. Construction of any hydraulic structures in stream channels will be in compliance with the Rules and Regulations pertaining to the Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code).

PRACTICE 15.21 - Maintenance of Roads

Objective: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

<u>*Effectiveness*</u>*:* Moderate

Compliance: FPA Rule 4.d.i, ii, iii, iv, v - Meets

Implementation: For roads in active timber sale areas standard TSC provision B5.4 (Road Maintenance) requires the purchaser to perform or pay for road maintenance work commensurate with the purchasers use. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract (C5.4 - Road Maintenance). Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in C5.411# and C5.412#. All maintenance work shall be done concurrently, as necessary, in accordance with T-specifications set forth herein or attached hereto, except for agreed adjustments (TSC C5.4-T301, 310).

1. Sidecast all debris or slide material associated with road maintenance in a manner to prevent their entry into streams [IFPA Rule 4(d)(i), Timber Sale Contract Clause C5.4, and Standard Road Specification-Special Project Specification T108].

2. Repair and stabilize slumps, slides, and other erosion features causing stream sedimentation [IFPA Rule 4(d)(ii), Timber Sale Contract Clauses C5.4 and C5.253, and Special Project Specification T108].

3. Active Roads. An active road is a forest road being used for hauling forest products, rock and other road-building materials. The following maintenance shall be conducted on such roads.

    (a) Culverts and ditches shall be kept functional.

    (b) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or water barred, and berms removed from the outside edge except those intentionally constructed for protection of fills.

(c) The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.

(d) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams [IFPA Rule 4(d)(iii)] and Timber Sale Contract Clauses C5.441 and C6.341].

Effectiveness: These measures should effectively minimize erosion from roads.

4. Inactive roads. An inactive road is a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.

   (a) Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, water barred or otherwise left in a condition to minimize erosion. Drainage structures will be maintained thereafter as needed.

   (b) The roads may be permanently or seasonally blocked to vehicular traffic [FPA Rule 4.d.iv].

   (c) Roads will be seeded and fertilized.

   (d) The roads may be permanently or seasonally blocked to vehicular traffic.

5. Abandoned Roads. An abandoned road is not intended to be used again. No subsequent maintenance of an abandoned road is required after the following procedures are completed:

   (a) The road is left in a condition suitable to control erosion by out-sloping, water barring, seeding, or other suitable methods.

   (b) Ditches are cleaned.

   (c) The road is blocked to vehicular traffic.

   (d) The department may require the removal of bridges and culverts except where the owner elects to maintain the drainage structures as needed.

For roads not in an active timber sale area, road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).

PRACTICE 15.24 - Snow Removal Controls

Objective: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

Effectiveness: Moderate

Compliance: No directly related FPA Rule

Implementation: For Forest roads that will be used throughout the winter, the following measures will be employed:

1. The Purchaser is responsible for snow removal in a manner that will protect roads and adjacent resources.
2. Rocking or other special surfacing and/or drainage measures may be necessary before the operator is allowed to use the roads.
3. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.
4. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

Idaho Panhandle National Forests Land and Resource Management Plan Consistency (IPNF, II-33)

The following specific management objectives pertaining to water resources are part of the Land and Resource Management Plan (Forest Plan) for the Idaho Panhandle National Forests:

1. Management activities on Forest Lands will not significantly impair the long-term productivity of the water resource and ensure that state water quality standards will be met or exceeded.

   Idaho State Best Management Practices (BMPs) are designed to protect the long-term productivity of the water resource and ensure state water quality standards will be met. The Chips Ahoy Project will meet standard BMPs. Site-specific BMPs were also included with this project as mitigation measures to improve water quality.

2. Maintain concentrations of total sediment or chemical constituents within state standards.

   The net production and delivery of sediment from the No Action alternative is only expected to decrease if the recommendations for road reconstruction and maintenance are implemented. Alternative B & C would substantially reduce production and potential for delivery of sediment to streams.

   The action alternatives would likely meet State standards for chemical constituents given that “Required Design Criteria for All Action Alternatives,” State and site-specific BMPs, and INFS standards would be applied if an action alternative is selected.

3. Implement project level standards and guidelines for water quality contained in the Best Management Practices.

Specific road maintenance and repair is needed for Alternative A to be consistent with Idaho Forest Practices Rules. The action alternatives are consistent with this criterion. In addition to standard State BMPs, other soil and water conservation practices that are approved BMPs are built into the timber sale contract. Site-specific BMPs are specified and are listed in the BMP portion of this appendix. Soil and water conservation principles were used during alternative design to determine the location and types of treatments including which areas should be avoided or restored. The specified and designed measures surpass those required by the State Forest Practices Act and are consistent with Forest Service standards.

4. Cooperate with the states to determine necessary instream flows for various uses.

   Instream flows are not an issue with any of the proposed projects. Therefore, this

   Standard is not applicable to any alternative.

5. Manage public water system plans for multiple uses by balancing present and future resources with public water supply needs.

   Streams not defined as public water systems, but used by individuals for such purposes, will be managed to standards established by the state's forest practices rules and/or the National Forests' BMPs or to the fisheries standards whichever is applicable.

   The Upper West Branch of Priest River is not defined as a public water system.

6. Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota.

   The existing biota will be maintained in first and second order streams through standard and site specific BMPs and the application of INFS standards and guidelines. Site Specific BMPs and applicable INFS standards and guidelines are listed and described in the BMP portion of this appendix.

7. It is the intent of this plan that models be used as a tool to approximate the effects of National Forest activities on water quality values.

   All alternatives meet this standard. The WATSED model was used to predict water and sediment yield changes. Road drainage crossings were inventoried to assess erosional hazards and risks to aquatic ecosystems, using the *Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings* (Flanagan et al 1998). This method gathered information on road-stream crossings that included fill volumes, culvert sizes, erosional features, and other variables, then ranked each crossing for treatment (project file).

   A modified version of the R1/R4 fish and fish habitat inventory (Overton et al 1997) was conducted along the Upper West Branch and some of its tributaries during the 1998, 2002 and 2003 field season. Additional stream information was collected to determine stream channel types, cross sectional profiles, woody debris composition and stream temperature. Existing and potential in-channel and stream-bank erosion sites were also documented with this survey.

Appendix B – Fisheries Management Direction and Guidelines

INFS Standards and Guidelines (USDA 1995, pp. A7-13)

Only INFS standards and guidelines that apply to the range of alternatives for the Chips Ahoy Project are addressed here; those standard and guidelines that do not apply are in the INFS document located in the project file. These INFS standards and guidelines are addressed with comments in italics as follows:

Timber Management (A-7)

TM-1. Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs.

b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoid adverse effects on inland native fish.

Using "Standard Widths Defining Interim RHCAs," no commercial timber harvest activities are proposed under the action alternatives within RHCAs in the project area.

Effectiveness: *High. No commercial harvest is to occur within the RHCAs.*

Roads Management (A-7-8)

RF-1. Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives.

The proposed activities are all on National Forest lands, but have been coordinated with all those listed where applicable.

Effectiveness: *High. This coordination is standard policy.*

RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by:

a. Completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas (RHCAs) within priority watersheds.
b. Minimizing road and landing locations in Riparian Habitat Conservation Areas.

No new roads or landings are proposed within RHCAs under any of the action alternatives.

Effectiveness: *High.*

c. Initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

1. Road design criteria, elements, and standards that govern construction and reconstruction.
2. Road management objectives for each road.
3. Criteria that govern road operation, maintenance, and management.
4. Requirements for pre-, during-, and post-storm inspections and maintenance
5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives such as protection of the road surface.
6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control.
7. Mitigation plans for road failures.

The interdisciplinary team (IDT) evaluated access and road improvement needs within the project area.

Effectiveness: *Moderate.*

d. Avoiding sediment delivery to streams from the road surface.

1. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is unfeasible or unsafe.

This standard is applied directly for the proposed temporary roads.

Effectiveness: *High. Roads would be constructed with this design.*

2. Route road drainage away from potentially unstable stream channels and hillslopes.

Effectiveness: High. Improved road drainage would be part of the road package. Water would be less concentrated below existing roads than at present.

e. Avoiding disruption of natural hydrologic flow paths.

Roadwork associated with this project including road reconstruction and decommissioning will be completed.

Effectiveness: High. Road reconstruction projects would restore the hydrologic flow paths.

f. Avoid sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.

Sidecasting of snow and/or soils would be prohibited at all stream crossings

RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation.

b. Prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.

c. Closing and stabilizing; or obliterating and stabilizing; roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds, and the ecological value of the riparian resources affected.

The proposed road reconstruction and maintenance described in Chapters II and III originate from the above standards. The action alternatives would meet this standard.

Effectiveness: High. Existing roads are proposed for reconstruction with the Timber Sale Contract, so the likelihood that the projects would be completed is high.

RF-4. Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bed load and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect priority watersheds from increased sedimentation. Base priority for upgrading on risks in priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

The proposed road crossing improvements originate from the above standard. The action alternatives would meet this standard.

Effectiveness: High. *There are no stream crossings for any of the temporary roads proposed under Alternatives B or D.*

RF-5. Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

Effectiveness: *High. There are currently no crossings that are known fish barriers in the project area. The proposed road design would maintain fish passage.*

Fires/Fuels Management (A-11)

FM-1. Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate detrimental conditions, or be damaging to, long-term ecosystem function or inland native fish.

FM-2. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.

FM-3. Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines that an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

FM-4. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.

Effectiveness: *High.*

FM-5. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland native fish whenever a wildfire or a prescribed fire burning out of prescription significantly damages Riparian Habitat Conservation Areas.

The proposed fires/fuels management described in Chapter 2, and 3 originate from the above standards. The action alternatives would meet this standard.

Effectiveness: *Moderate to High. Prescribed fire in the project area is designed to meet these standards.*

General Riparian Area Management (A-12)

RA-1. Identify and cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

This project does not adversely affect instream flows.

RA-2. Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

This project does not propose any treatments in RHCAs.

RA-3. Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.

By following the BMPs listed in the Priest Lake Noxious Weed FEIS, all alternatives would meet this standard.

Effectiveness: High. Standards would be met as required by the Priest Lake Noxious Weed EIS.

RA-4. Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling with Riparian Habitat Conservation Areas unless there are no other alternatives. The Forest Service must approve refueling sites within a Riparian Habitat Conservation Area or Bureau of Land Management and have an approved spill containment plan.

Effectiveness: High. This is a standard BMP that is part of the timber sale contract.

RA-5. Locate water-drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

Effectiveness: Moderate. This standard would be applied in the prescribed burn plans associated with the Chips Ahoy project. However, wildfire suppression is beyond the scope of this project, and water drafting associated with such an emergency would be addressed as a separate issue.

Watershed and Habitat Restoration (A-12)

WR-1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.

Effectiveness: High. The proposed watershed restoration projects originate from the above standard. The action alternatives would meet this standard.

WR-2. Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet Riparian Management Objectives.

Effectiveness: Moderate to High. Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project.

Fisheries and Wildlife Restoration (A-13)

FW-1. Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the Riparian Management Objectives.

Effectiveness: High. Improvements to culverts and road decommissioning are habitat enhancement actions that will be implemented in a manner that contributes to attainment of Riparian Management Objectives.

FW-4. Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.

Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project. Using the INFS Standard Widths Defining Interim RHCAs for the project activities, habitat manipulation does not apply. Fish stocking, harvest and/or poaching are all regulated by State management guidelines.

Effectiveness: High. Existing habitat would be preserved under this project.

Forest Plan Guidelines (USDA 1987, pp. II – 29-31)

Fry Emergence (Fish Standard 1 and 2):

The IPNF Forest Plan contains standards for fry emergence that are no longer valid since the Inland Native Fish Strategy was developed. This section explains why.

The objectives for fisheries in the Forest Plan state that the forest “will be managed to maintain and improve fish habitat capacities in order to achieve cooperative goals with the State Fish and Game Department and to comply with state water quality standards. Sediment arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent fry emergence success as measured from pristine condition” (II-7). The first two standards for fish use similar language (II-29). The Fishery/Watershed Analysis to determine effects of land management activities on fry emergence is described in Appendix I (I-1, 2).

Appendix I requires that if, during the environmental assessment process, cumulative effects of the proposed and past activities on stream sedimentation are projected to result in greater than 20% reduction in fry emergence, then additional detailed analysis will be undertaken. The analysis is then used to determine the significance of the project on water resources. If the project is judged to have a "significantly negative effect" on water resources, it will be reviewed by the State for conformance with water quality standards prior to the final decision.

At the time the Forest Plan was written, models determining fry emergence (e.g., Stowell *et al.* 1983) were popular. These empirical models were later found to have limited application and were unreliable outside of where they were developed (Kershner 2001 personal communication). In addition, the use of fry emergence survival (regardless of the threshold) as a surrogate for viability came into question, primarily for two reasons:

- First, fry emergence is highly variable. This can be due to changing natural conditions (e.g., floods, temperature regimes, geology) or human-induced causes (e.g., increased sediment input, chemical spills). Both agents are at work in most cases so it is difficult to determine what proportion of egg-to-fry mortality is due to each cause. As a result the underlying relationship between sediment in redds and survival is difficult to predict (Chapman 1988).
- Second, and more important, egg-to-fry mortality is usually density-independent (i.e., a percentage of fry will survive regardless of the number of eggs). This means that in most cases there are enough fry to inhabit all available habitat within a stream. Therefore fry-to-smolt (sub-adult) survival, where density dependent mortality plays a significant role, is a more effective and appropriate predictor of population viability than egg-to-fry survival (for a review of these concepts see Hilborn and Walters 1992). Currently the indicator used as a surrogate of fry-to-smolt survival is stream habitat characteristics.

The 1989 Forest Plan Evaluation and Monitoring Report documents the change away from use of the fry emergence standard (Item G-1, pages C-1 and C-2). The findings were that it was not a good monitoring tool to report stream health. G-1 was combined with item G-3, which includes a comprehensive array of fisheries and hydrology parameters.

The Inland Native Fish Strategy (INFS) (USDA 1995) amended the Forest Plans "…except where existing Plan direction would provide more protection" for inland native fish habitat (page 4). All INFS standards and guidelines are intended to either make progress toward Riparian Management Objectives (which describe "good" fish habitat within the context of what is capable of the watershed) or to ensure that activities will not retard the natural rate of recovery of RMOs in a watershed (USDA 1995, A6-A16). In addition, the strategy states that actions that reduce habitat quality, whether existing conditions are better or worse than objective values, are not consistent with INFS direction (USDA 1995, A-3).

INFS supersedes the original IPNF Forest Plan direction because it offers far more protection to inland native fish habitat for the following reasons:

- INFS directs the establishment of Riparian Habitat Conservation Areas (RHCAs) and only allows activities within RHCAs that maintain or improve, and do not retard, the attainment of the RMOs. The original Forest Plan direction actually permitted degradation of water resources at the discretion of the line officer, and allowed "significant" degradation after review by the State.
- Activities that reduce habitat quality to any extent are contrary to INFS direction, regardless of whether RMOs have been attained. The original Forest Plan direction allowed for apparent degradation of fish habitat by permitting up to a 20 percent reduction of potential fry emergence.

In *The Lands Council v. Vaught* the U. S. District Court for the Eastern District of Washington, in its reading of the plain language of the INFS documents and giving deference to the Forest Service's expertise in interpreting its Forest Plans, concluded that INFS does supersede the Forest Plan in all areas where RHCA guidelines and standards apply (i.e., where delivery of sediment to streams is the identified threat that proposed project activities pose to fish habitat). The Forest Plan standards remain in effect in all other areas.

In conclusion, this project complies with original Forest Plan direction because, although fry emergence was not computed, a detailed analysis of the effects to fish habitat and water resources was developed as required in Appendix I; and the project has been determined to be fully consistent with the INFS Forest Plan amendment and state water quality standards for supporting beneficial uses (see Watershed discussion).

3. The stream and river segments (if listed) will be managed as low access fishing opportunities to maintain a diversity of fishing experiences for the public and to protect sensitive fish populations. Special road management provisions will be used to accomplish this objective. "Low Access Fishing Streams"

Forest Plan standards 3 are not inclusive to this analysis because no streams in the analysis area are listed under "low access fishing streams." However, streams within the analysis area are recognized as to providing beneficial uses.

4. Provide fish passage to suitable habitat areas, by designing road crossings of streams to allow fish passage or removing in-stream migration barriers.

91 culverts are scheduled for removal associated under the road decommissioning aspect of this project. Additionally 15 more culverts are to be improved or upgraded along haul routes. The temporary road construction planned will only cross intermittent channels. Culvert surveys were completed in 2003 in portions of the Priest Lake Ranger District; however, the results of these surveys are not currently available. Removing and/or upgrading the culverts discussed above, and only crossing intermittent channels with the temporary road would restore habitat connectivity in many of these areas.

5. Utilize data from stream, river, and lake inventories to prepare fishery prescriptions that coordinate fishery resource needs with other resource activities. Pursue fish habitat improvement projects to improve habitat carrying capacities on selected streams.

As stated in Chapter III, information was utilized from stream inventories, field reviews, historical records, aerial photographs, analysis of watershed conditions, published scientific literature, discussions with Fisheries Biologists and electrofishing/stocking data from the Idaho Department of Fish and Game (IDF&G), the United States Fish and Wildlife Service (USFWS), electrofishing data from the Kalispell Tribe and comprehensive knowledge of the fisheries resources in the Upper West Branch Watershed.

6. Coordinate management activities with water resource concerns as described in MA 16, Appendix I, and Appendix O.

Water resource concerns are protected in Management Area 16 through INFS standards and guidelines.

State of Idaho Governor's Bull Trout Plan

The following describes a "step down" process from the Governor's Bull Trout Plan.
Governor's Bull Trout Plan (State of Idaho 1996):

- The mission of the plan is to "…maintain and or restore complex interacting groups of bull trout populations throughout their native range in Idaho.
- The Plan created the Basin Advisory Groups, which oversee the Watershed Advisory Groups (WAG). The Technical Advisory Team's role is to assist the WAG with issues regarding recovery of bull trout in each key watershed.
- The conservation plan emphasizes restoration activities in High Priority watersheds only.

Appendix C –Vegetation Information

The Forest Vegetation section of Chapter III contains a summary of the laws and regulations that pertain to the management of forest vegetation on National Forest lands. This appendix begins by providing a more thorough discussion of that topic. It then provides a table for each alternative showing vegetation prescriptions and activities proposed by unit. Finally, there is discussion on whether the various alternatives are consistent with forest plan standards for old growth, timber, and forest protection, and with the National Forests Management Act.

Regulatory Framework

The legal and regulatory framework for the management of forest vegetative resources on the Idaho Panhandle National Forests includes the:

Idaho and Washington Forest Practices Acts
Multiple-Use Sustained Yield Act of 1960
Endangered Species Act of 1971
Forest and Rangeland Renewable Resources Planning Act of 1974
National Forest Management Act of 1976
Idaho Panhandle National Forests 1987 Forest Plan
Forest Service regulations and policies

As amended, the Forest and Rangeland Renewable Resources Planning Act (RPA) states, *"It is the policy of Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans."* (RPA sec. 3 (d)(1) and NFMA sec. 4.

RPA and NFMA (sec. 6 [g]) also indicate that plans will be developed which specify guidelines to:

- *Identify the suitability of lands for resource management;*
- *Provide for the diversity of plant and animal communities based on the suitability and capability of land areas to meet multiple-use objectives;*
- *Where appropriate, to the degree practicable, preserve the diversity of tree species similar to that existing in planning area;*
- *Insure that timber will be harvested from National Forest System Lands only where soil, slope, or other watershed conditions will not irreversibly damaged; the lands can be adequately restocked within fire years after harvest; protection is provided for streams, stream banks, shorelines, lakes, wetlands and other bodies of water where harvests are likely to seriously and adversely affect water conditions and fish habitat; and the harvesting system used is not selected primarily because it will give the greatest dollar return or the greatest output of timber.*

This section of RPA and NFMA goes on to state that any cut designed to regenerate an even-aged stand of timber must be determined to be appropriate to meet the objectives and requirements of the land management plan and, in the case of clearcutting, is the optimum method; has had an interdisciplinary review of impacts and the cuts are consistent with the multiple use of the federal area; will be shaped and blended, to the extent practicable, with the natural terrain; meets established, suitable size limits; and is carried out in a manner consistent with protection of soil, watershed, fish, wildlife, recreation, esthetic resource, and the regeneration of the timber resource.

Prior to harvest, stands of trees shall generally have reached culmination of mean annual increment of growth (RPA and NFMA sec. 6 (m)(l). This does not preclude the use of sound silvicultural systems such as thinning and other stand improvement measures, and allows salvage or sanitation harvest following fire, wind throw, or other catastrophe or within stands in imminent danger of insect and disease attack.

Forest Service policy (FSM 2470.3) (USDA, 1990) and Regional Guide (USDA, 1983) directs land managers to:

1. *Use only those silvicultural practices that are best suited to the land management objectives for the area. Consider all resources, as directed in the appropriate forest plan.*
2. *Prescribe treatments that are practical in terms of cost of preparation, administration, transportation systems and logging methods.*
3. *Monitor practices, using procedures specified in forest plans to ensure objectives are met.*
4. *Before scheduling stands for regeneration harvest, ensure, based on literature, research, or local experience, that stands to be managed for timber production can be adequately restocked within 5 years of final harvest. Five years after final harvest means five years after clearcutting, final overstory removal in shelterwood cutting, the seed tree removal cut in seed tree cutting or after selection cutting.*
5. *Perform all silvicultural activities in the most cost effective manner consistent with resource management objectives.*
6. *The size of tree openings created by even aged silvicultural methods will normally be 40 acres or less. With some exceptions, creation of larger openings will require 60-day public review and Regional Forester approval.*
7. *Forest management purposes, cut areas created by even aged management will no longer be considered openings when both vegetation and watershed conditions meet management objectives established for the management area.*

Management activities will promote programs that provide a sustained yield of forest products consistent with the multiple use goals established in Regional Guides and the Forest Plan (Forest Plan II-8). Timber management activities will be the primary process used to minimize the hazards of insects and diseases and will be accomplished primarily by maintaining stand vigor and diversity of plant communities and tree species (Forest Plan II-8).

Protection of timber stands from insect and disease problems will center on the silvicultural treatments prescribed for timber management activities (Forest Plan II-10) and use of silvicultural methods and schedule cultural practices within reduce the development and/or perpetuation of pest problems (Forest Plan II-39). Proposed activities will be consistent with Management Area objectives. Descriptions and objectives of these Management Areas are briefly described in Chapter 1 of this document and further detailed in the Forest Plan (Forest Plan Chapter II).

Unit Prescriptions and Treatments by Action Alternative

Table C-1. Alternative B Vegetative Treatments

Unit Number	Acres	RX	Logging System	Fuels Treatment	PCC Before	PCC After
1	16	IC	H	UB	65	50
2	12	ST	H	UB	40	10
4	44	ISW	H	UB	45	20
5	33	IC/SW	H	UB/LS	80	60
6	37	IC	S	LS	85	55
7	21	ST	S/T	UB	75	20
9	6	ISW	H	UB	45	20
10	13	ISW	H	UB	50	20
11	9	ST	T	UB	65	10
12	35	ISW	S	UB	65	35
13	20	ISW	H	UB	60	30
14	13	ISW	S	UB	50	20
15	90	ISW	S	UB	50	30
16	33	ISW	H	UB	50	30
17	19	ISW	H	UB	60	35
18	11	ST/IC	S	UB	70	40
19	19	ST	H	UB	60	15
20	5	IC	S	UB	65	45
22	20	ST	H	UB	50	15
24	14	ST	H	UB	80	15
25	23	ST	H	UB	70	10
26	19	ST	H	UB	60	15
27	6	ST	H	UB	40	10
28	30	ST	S/T	UB	70	15
29	11	ST	T	UB	40	10
30	2	ST	H	UB	40	10
31	6	ST	S	UB	40	10
32	13	ST	T	UB	60	35
33	71	ST	S	UB	50	10
34	5	ST	H	UB	40	15
35	7	ST	S	UB	50	15
36	16	ISW	H	UB	80	30
37	12	ST	H	UB	65	15
38	9	ST	H	UB	65	20
39	13	ST	S	UB	65	20
40	10	ST	S	UB	65	20
41	17	ST	S/T	UB	65	15
42	36	ST	H	UB	65	15
43	4	ISW	H	UB	75	25
44	6	ST	S/T	UB	65	15
45	11	ISW	H	UB	60	20
46	5	ST	H	UB	60	15
47	5	ST	S	UB	50	15
48	14	IC	S	UB	70	40

Unit Number	Acres	RX	Logging System	Fuels Treatment	PCC Before	PCC After
49	9	IC	S	UB	60	40
50	5	ST	S	UB	50	15
51	64	SWR	S/T	LS	40	15
52	80	SS	T	LS	99	70
53	31	SWR	S	LS	30	15
54	74	CT	LF	GP	99	70
55	80	SWR	T	LS	40	10
56	8	ST	T	UB	85	20
57	17	EB	N/A	UB	25	25
58	5	CT	LF	GP	95	70
59	4	EB	N/A	UB	20	20
60	11	EB	N/A	UB	15	15
61	80	IC	H	LS	70	55
62	31	ISW	H	UB	80	20
64	6	ISW	S/T	UB	80	25
65	69	IC	H	LS	70	55
67	37	SS	LF	GP	80	55
68	30	SS	LF	GP	80	55
69	5	ISW	S	UB	80	25
70	3	IC	T	LS	65	50
71	19	SWR	S	LS	35	15
72	29	CT	LF	GP	95	70
73	14	SS	S	LS	70	65
74	4	SWR	S	LS	20	10
75	18	IC	H	UB	90	75
76	40	ISW	S	LS	35	15
77	20	SWR	S	LS	30	10
78	21	SS	LF	GP	95	75
81	28	SWR	S	LS	35	10
82	16	SWR	S	LS	50	10

*Unit acres have been rounded to the nearest acre from the GIS shape files.

Rx = Silvicultural prescription **UB** = Underburn
PCC = Percent canopy closure **GP =** grapple pile
CT = Commercial thin **H =** Helicopter
SS = Sanitation Salvage **S =** Skyline (Cable)
ISW = Irregular Shelterwood **T =** Tractor
ST = Seed Tree **EB** = Ecoburn
SWR= Shelterwood removal **IC** = Improvement Cut
LF=Log forwarder

Table C-2. Alternative C Vegetative Treatments

Unit Number	Acres	RX	Logging System	Fuels Treatment	PCC Before	PCC After
1	16	IC	H	UB	65	50
2	12	ST	H	UB	40	10
4	44	ISW	H	UB	45	20
5	33	IC/SW	H	UB/LS	80	60
6	37	IC	S	LS	85	55
7	21	ST	S/T	UB	75	20
9	6	ISW	H	UB	45	20
10	13	ISW	H	UB	50	20
11	9	ST	T	UB	65	10
12	35	ISW	S	UB	65	35
13	20	ISW	H	UB	60	30
14	13	ISW	S	UB	50	20
15	90	ISW	S	UB	50	30
16	33	ISW	H	UB	50	30
17	19	ISW	H	UB	60	35
18	11	ST/IC	S	UB	70	40
19	19	ST	H	UB	60	15
20	5	IC	S	UB	65	45
22	20	ST	H	UB	50	15
24	14	ST	H	UB	80	15
25	23	ST	H	UB	70	10
26	19	ST	H	UB	60	15
27	6	ST	H	UB	40	10
28	30	ST	H	UB	70	15
29	11	ST	H	UB	40	10
30	2	ST	H	UB	40	10
31	6	ST	H	UB	40	10
32	13	ST	H	UB	60	35
33	71	ST	H	UB	50	10
34	5	ST	H	UB	40	15
35	7	ST	H	UB	50	15
36	16	ISW	H	UB	80	30
37	12	ST	H	UB	65	15
38	9	ST	H	UB	65	20
39	13	ST	S	UB	65	20
40	10	ST	S	UB	65	20
41	17	ST	S/T	UB	65	15
42	36	ST	H	UB	65	15
43	4	ISW	H	UB	75	25
44	6	ST	S/T	UB	65	15
45	11	ISW	H	UB	60	20
46	5	ST	H	UB	60	15
47	5	ST	S	UB	50	15
48	14	IC	S	UB	70	40
49	9	IC	S	UB	60	40

Unit Number	Acres	RX	Logging System	Fuels Treatment	PCC Before	PCC After
50	5	ST	S	UB	50	15
51	64	SWR	S/T	LS	40	15
52	80	N/A	N/A	N/A	99	99
53	31	SWR	S	LS	30	15
54	74	CT	LF	GP	99	70
55	80	SWR	T	LS	40	10
56	8	ST	T	UB	85	20
57	17	EB	N/A	UB	25	25
58	5	CT	LF	GP	95	70
59	4	EB	N/A	UB	20	20
60	11	EB	N/A	UB	15	15
61	80	IC	H	LS	70	55
62	31	ISW	H	UB	80	20
64	6	ISW	S/T	UB	80	25
65	69	IC	H	LS	70	55
67	37	SS	LF	GP	80	55
68	30	SS	LF	GP	80	55
69	5	ISW	H	UB	80	25
70	3	IC	T	LS	65	50
71	19	SWR	S	LS	35	15
72	29	CT	LF	GP	95	70
73	14	SS	S	LS	70	65
74	4	SWR	S	LS	20	10
75	18	IC	H	UB	90	75
76	40	ISW	S	LS	35	15
77	20	SWR	S	LS	30	10
78	21	SS	LF	GP	95	75
81	28	SWR	S	LS	35	10
82	16	SWR	S	LS	50	10

*Unit acres have been rounded to the nearest acre from the GIS shape files.

Rx = Silvicultural prescription **UB** = Underburn
PCC = Percent canopy closure **GP =** grapple pile
CT = Commercial thin **H =** Helicopter
SS = Sanitation Salvage **S =** Skyline (Cable)
ISW = Irregular Shelterwood **T =** Tractor
ST = Seed Tree **EB** = Ecoburn
SWR= Shelterwood removal **IC** = Improvement Cut
LF=Log forwarder

Table C-3. Alternative D Vegetative Treatments

Unit Number	Acres	RX	Logging System	Fuels Treatment	PCC Before	PCC After
1	16	IC	H	UB	65	50
2	12	N/A	N/A	N/A	40	40
4	44	N/A	N/A	N/A	45	40
5	33	N/A	N/A	N/A	80	70
6	37	IC	S	LS	85	55
7	21	N/A	N/A	N/A	75	65
9	6	N/A	N/A	N/A	45	40
10	13	N/A	N/A	N/A	50	40
11	9	N/A	N/A	N/A	65	60
12	35	N/A	N/A	N/A	65	45
13	20	N/A	N/A	N/A	60	45
14	13	N/A	N/A	N/A	50	45
15	90	N/A	N/A	N/A	50	45
16	33	N/A	N/A	N/A	50	40
17	19	N/A	N/A	N/A	60	40
18	11	N/A	N/A	N/A	70	65
19	19	N/A	N/A	N/A	60	55
20	5	IC	S	UB	65	45
22	20	N/A	N/A	N/A	50	40
24	14	N/A	N/A	N/A	80	50
25	23	N/A	N/A	N/A	70	45
26	19	N/A	N/A	N/A	60	50
27	6	N/A	N/A	N/A	40	35
28	30	N/A	N/A	N/A	70	50
29	11	N/A	N/A	N/A	40	35
30	2	N/A	N/A	N/A	40	35
31	6	N/A	N/A	N/A	40	40
32	13	N/A	N/A	N/A	60	50
33	71	N/A	N/A	N/A	50	45
34	5	N/A	N/A	N/A	40	40
35	7	N/A	N/A	N/A	50	45
36	16	N/A	N/A	N/A	80	65
37	12	N/A	N/A	N/A	65	55
38	9	N/A	N/A	N/A	65	65
39	13	N/A	N/A	N/A	65	50
40	10	N/A	N/A	N/A	65	65
41	17	N/A	N/A	N/A	65	45
42	36	N/A	N/A	N/A	65	45
43	4	N/A	N/A	N/A	75	70
44	6	N/A	N/A	N/A	65	50
45	11	N/A	N/A	N/A	60	45
46	5	N/A	N/A	N/A	60	60
47	5	N/A	N/A	N/A	50	50
48	14	IC	S	UB	70	40
49	9	IC	S	UB	60	40

Unit Number	Acres	RX	Logging System	Fuels Treatment	PCC Before	PCC After
50	5	N/A	N/A	N/A	50	40
51	64	SWR	S/T	LS	40	15
52	80	SS	T	LS	99	70
53	31	SWR	S	LS	30	15
54	74	CT	LF	GP	99	70
55	80	SWR	T	LS	40	10
56	8	N/A	N/A	N/A	85	70
57	17	EB	N/A	UB	25	25
58	5	CT	LF	GP	95	70
59	4	EB	N/A	UB	20	20
60	11	EB	N/A	UB	15	15
61	80	IC	H	LS	70	55
62	31	N/A	N/A	N/A	80	70
64	6	N/A	N/A	N/A	80	70
65	69	IC	H	LS	70	55
67	37	SS	LF	GP	80	55
68	30	SS	LF	GP	80	55
69	5	N/A	N/A	N/A	80	80
70	3	IC	T	LS	65	50
71	19	SWR	S	LS	35	15
72	29	CT	LF	GP	95	70
73	14	SS	S	LS	70	65
74	4	SWR	S	LS	20	10
75	18	IC	H	UB	90	75
76	40	N/A	N/A	N/A	35	35
77	20	SWR	S	LS	30	10
78	21	SS	LF	GP	95	75
81	28	SWR	S	LS	35	10
82	16	SWR	S	LS	50	10

*Unit acres have been rounded to the nearest acre from the GIS shape files.

Rx = Silvicultural prescription **UB** = Underburn
PCC = Percent canopy closure **GP =** grapple pile
CT = Commercial thin **H =** Helicopter
SS = Sanitation Salvage **S =** Skyline (Cable)
T = Tractor **EB** = Ecoburn
SWR= Shelterwood removal **IC** = Improvement Cut
LF=Log forwarder

Consistency with Forest Plan Standards

Forest Plan Standards for Old Growth

Old Growth Standard 10a: A definition for old growth is being developed by a Regional Task Force and will be used by the Forest when completed. As an interim guideline, stands classified as old growth should meet the definition given by Thomas (1979).

The Regional Task Force completed its work and published its report. That report is Old Growth Forest Types of the Northern Region by P. Green, et al., and is part of the R-1 SES Series released in April 1992 by the Northern Region, Forest Service, USDA. The IPNF used the definitions in this report in allocating its Old Growth. Therefore, this standard has been met.

Old Growth Standard 10b: Maintain at least 10 percent of the forested portion of the IPNF as old growth.

The Forest Plan identified 2,310,000 forested acres on the IPNF. Therefore, the Forest Plan Standard requires maintaining 231,000 acres of old growth. The most recent Forest Plan Monitoring Report (2002) indicates that a total of 276,494 acres has been allocated on the IPNF (USDA 2002, p. 68). This is equivalent to 12%. Therefore, this standard has been met.

Priest Lake Ranger District's old growth allocation - The IPNF old growth allocation of 10% old growth was distributed among the districts as documented in the Forest Supervisor's May 7, 1991 letter concerning the subject "Forest Plan Explanation: Implementing Old Growth Standards (see Vegetation section of project file). The Priest Lake Ranger District was responsible for allocating 38,000 acres of old growth. The 2002 Forest Plan Monitoring Report indicates that 46,414 acres has actually been allocated on the District (USDA 2002). Therefore, the Forest Supervisor's allocation was actually exceeded on the District.

Old Growth Standard 10c: Select and maintain at least five percent of the forested portion of those old growth units that have five percent or more of existing old growth.

Old Growth Standard 10d: Existing old growth stands may be harvested when there is more than 5% in an old growth unit, and the Forest total is more than 10%.

The Chips Ahoy Project Area is within a portion of six Old Growth Management Units (OGMU's). Table C-4displays current allocations in these OGMUs.

Five of the six OGMUs have more than 5 percent allocated old growth. OGMU 16 has 1.9% of the stands identified as allocated old growth. The reason that this OGMU does not contain any more old growth stands is because of the extensive wildfire and early logging history. Most stands in that OGMU are in an immature/small timber structural stage and regenerated after a large wildfire in 1926.

None of the alternatives would harvest old growth. A review of the Chips Ahoy project area was conducted to validate the current status of stands for old growth. This review and additional old growth information is found in the Vegetation section of the project files. Old growth standards 10c and 10d would be met under any alternative.

Table C-4. Current old growth allocations within OGMUs

OGMU (Unit #)	Total Acres of OGMU	Allocated Old growth	
		Acres	% of OGMU
11	15,652	1,797	11.5
12	14,578	2,906	19.9
16	17,014	315	1.9
17	11,673	1,255	10.8
18	14,682	982	6.7
28	8,680	3,890	44.8

Old Growth Standard 10e: Old growth stands should reflect approximately the same habitat types series distribution as found on the IPNF.

The habitat type series distribution of the allocated old growth on the IPNF reflects approximately the same habitat types series distribution on the IPNF. The 2002 Forest Plan Monitoring report supports this finding (USDA 2002 p. 69).

Old Growth Standard 10f: One or more old growth stands per old growth unit should be 300 acres or larger. Preferences should be given to a contiguous stand; however the stand may be subdivided into stands of 100 acres or larger if the stands are within one mile. The remaining old growth management stands should be at least 25 acres in size. Preferred size is 80 plus acres.

All or portions of six OGMUs occur in the Chips Ahoy project area. These include units #11, 12, 16, 17, 18, and 28. These OGMUs do not contain individual stands 300 acres or larger. However, with the exception of OGMU #16, all of the units either contain old growth "blocks" (multiple stands that are contiguous) that add up to 300 acres or larger, or they have old growth blocks that are 100 acres or larger that lie within one mile of one another and cumulatively add up to 300 acres or more.

Old Growth Standard 10g: Roads should be planned to avoid old growth management stands to maintain unit size criteria.

If implemented, Alternatives B and D would include some system and temporary road construction. Alternative C would no construct any new roads. The construction that would occur for Alternatives B and C would not occur in old growth stands (see Vegetation section of project file). Therefore, the standard would be met for all alternatives.

Old Growth Standard 10h: A long-term objective should be to minimize or exclude domestic grazing within old growth stands.

The proposed activities would not include any new domestic grazing allotments. There are currently two **inactive** grazing allotments in the area. Even if these allotments were to become active again, it is unlikely that grazing would occur within old growth stands in the area since old growth structures do not normally provide much forage for these animals. This standard would be met under any alternative.

Old Growth Standard 10i: Goals for lands to be managed as old growth within those lands suitable for timber production are identified in the management area prescriptions.

The 2002 Forest Plan Monitoring report (USDA 2002) includes a table showing the Forest Plan management areas that have acre goals associated with them for old growth allocation. The table also shows the existing amounts of allocated old growth for those same areas. Current old growth allocations meet and far exceed those Forest Plan goals. Therefore, this standard has been met.

Forest Plan Standards for Timber

Timber Standard 1. Both even-aged and uneven-aged silvicultural systems will be employed on the IPNF and will meet resource and vegetation management objectives identified in the Forest Plan. Even-aged silvicultural systems will be applicable over most areas. Uneven-aged systems may be used to achieve special management objectives as determined by the ID Team during project analysis.

Uneven-aged silvicultural systems would not be used under any of the action alternatives. There were no special management objectives identified by the ID Team that necessitated using this system. Therefore, this standard would be met under any alternative.

If implemented, Alternatives B and C would utilize a substantial amount of even-aged silvicultural systems to regenerate stands to desirable species. Alternative D, which was developed to respond to public concerns regarding the creation of additional openings through timber harvesting, would use very little even-aged management (only Shelterwood Final Removals where the openings have already been created). Instead, most of the treatment that would be conducted within Alternative D would be done using various intermediate treatments, where the decision on using even-aged versus uneven-aged regeneration systems is not being made at this time.

Timber Standard 2. Timber stands that are substantially damaged by fire, wind throw, insect or disease attack, or other catastrophe may be harvested where this salvage is consistent with silvicultural and environmental standards. All management areas are open to this potential salvage activity except Management Areas 11 and 14.

Salvage of damaged timber is integrated into the silvicultural treatments proposed under the action alternatives. No vegetative manipulation would occur in Management Areas 11 (existing or proposed wilderness areas) or 14 (Research Natural Areas). This standard would be met under any alternative.

Timber Standard 3. Recommended changes in timber resource land suitability from the approved Forest Plan will be based upon the criteria contained in 36 CFR 219.14(a). Changes from suitability classification will be done in accordance with the procedures outlined in Appendix M.

As discussed in more detail within the project file, small adjustments to suitability would be made. Three stands that were previously identified as being unsuitable were reviewed in the field and it was determined that they are suitable. Per Forest Plan Appendix M, a recommendation will be made to the Forest Supervisor to make these changes.

Timber Standard 4. 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.

All regeneration areas would be planted with seedlings from a site-adapted species/seed source. Mixtures of seral tree species such as white pine, larch and ponderosa pine would be planted. To the extent that they are present and healthy, the intermediate treatments (the areas that would not be regenerated) would retain the long-lived seral species. This standard would be met under all of the action alternatives.

Timber Standard 5. Project design will provide for site preparation and slash hazard reduction practices that meet reforestation needs of the area.

For stands that would be regenerated under the proposed alternatives, the site preparation/fuel treatment methods that are proposed were identified based upon meeting the necessary site conditions for reforestation. Therefore, this standard would be met under any alternative.

Timber Standard 6. Timber harvest schedules and access will be coordinated with intermingled landowners where applicable.

Current access to private property in the Chips Ahoy Project Area would be maintained under all alternatives. This was one of the items considered when the Roads Analysis Process was conducted for this project. This standard would be met under any alternative.

Timber Standard 7. Openings created by even-aged silviculture will be shaped and blended to forms of the natural terrain to the extent practicable; in most situations they will be limited to 40 acres. Creation of larger openings must conform to current Regional guidelines regarding public notification, environmental analysis and approval.

Timber Standard 8. An area of National Forest land will no longer be considered an opening when vegetation meets management goals established for the management area in accordance with the Regional Guide. Lands in other ownership within or adjacent to National Forest land will be included in the analysis when planning openings.

As discussed earlier in the forest vegetation section, Alternatives B and C would create openings that are larger than 40 acres. As compared to smaller, more numerous openings, larger openings generally lead to less fragmentation of the forest and produce better wildlife habitat for certain species that need larger “block” sizes. As required, the public will be informed that some of the alternatives would lead to openings larger than 40 acres. Approval to exceed the 40-acre opening size limitation would be received from the Regional Forester prior to a decision. Proposed harvest openings greater than 40 acres are identified in the Vegetation section of the project files. Timber standards 7 and 8 would be met under any alternative.

Timber Standard 9. The silvicultural prescription for each stand will establish the level of management intensity compatible with the management area goals. Preferred species management as identified in the silvicultural prescription will consider both biological and economic criteria.

All vegetative treatments would have silvicultural prescriptions approved by a certified Silviculturist. Prescriptions would consider site-specific factors (such as physical site, soils, climate, habitat type, and current vegetative composition and conditions) as well as interdisciplinary objectives and Forest Plan goals, objectives and standards. This standard would be met under any alternative.

Forest Plan Standards for Forest Protection

Forest Protection Standard 1. Use integrated pest management methods that provide protection of forest resources with the least hazard to humans, wildlife and the environment.

Forest Protection Standard 2. Use silvicultural methods and schedule practices that reduce the development and/or perpetuation of pest problems.

As described earlier, the composition of the forests in the Priest River Subbasin and Upper West Branch drainage has shifted from being dominated by long-lived, seral species that were fairly resistant to native insects/diseases, to species that tend to be more susceptible to these agents. Because of this shift, as well as the introduction of the non-native white pine blister rust, the insects/diseases have taken on a different and/or more significant role in the forests than historically. One main objective of this project is to trend the forests back towards a composition that is more comparable to historic conditions. The vegetative treatments (including those listed under opportunities such as the white pine pruning and pre-commercial thinning) that are part of the action alternatives would make some progress towards meeting this objective. The regeneration treatments that are part of Alternative B and C would convert stands that are dominated by the more insect/disease susceptible species (primarily Douglas-fir and grand fir) to the more resistant species (larch, ponderosa pine, and blister rust resistant white pine). The intermediate treatments that are part of all of the action alternatives would favor the species that are more insect/disease resistant. Therefore, all of the action alternatives would meet these Forest Plan Protection standards.

Forest Protection Standard 3. Vegetation management will favor the use of fire, hand treatment, natural control, or mechanical methods wherever feasible and cost effective. Direct control methods, such as chemical or mechanical, may be used when other methods are inadequate to achieve control.

Proposed vegetative treatments would utilize a combination of fire, hand treatment and natural and mechanical methods. Forest vegetative treatment using chemicals is not proposed under any alternatives. This standard would be met under any alternative.

Consistency with the National Forest Management Act

Vegetation Manipulation (36 CFR 219.27(b)[1]. Assure that technology and knowledge exists to adequately restock lands within fire years after final harvest. Technology and knowledge does exist to comply with this requirement. The IPNF Forest Plan Monitoring and Evaluation Report, 1998, page 7, states that "over the last 11 years of monitoring, our reforestation success rate has averaged 88 percent". Regeneration success on the Priest Lake Ranger District is 99.8 percent overall for the period 1976 to 1996 with 79 percent within 5 years of regeneration harvest (see Vegetation section of the project file).

Vegetation Manipulation (36 CFR 219.27(b)[1]. Be chosen after considering potential effects on residual trees and adjacent stands. The analysis considered the effects on residual trees and adjacent stands. This was one of the factors considered during the development of the silvicultural diagnosis for the timber stands. Therefore, all of the alternatives would be consistent with this requirement.

Silvicultural Practices (36 CFR 219.27(c): No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suitable for timber production.

Guidelines for determining suitability are found in the Forest Plan and FSH 2409.13. Portions of two of the proposed treatment units (Units 61 and 65) occur within timber stands that are designated as unsuitable. This determination was made because of concerns that the sites might not be able to be restocked within 5 years following a regeneration harvest. However, the type of treatment (improvement cut) proposed for these units is not designed to regenerate the stand and is being conducted for reasons other than timber production. As described in more detail later in this Appendix, the treatment that is proposed for these areas is designed to thin the stands to achieve the primary objective of giving the ponderosa pine (and larch) more growing room so that it is not out competed by the more shade tolerant Douglas-fir. The harvesting that is proposed for this area would protect other multiple-use values. It would help create an important ecological resource, namely the development of stands containing large, old ponderosa pine trees that are in short supply across the landscape compared to historical conditions. For these reasons, the alternatives are consistent with this regulation.

Even-aged Management (36 CFR 219.27(d): When timber is to be harvested using an even-aged management system, a determination that the system is appropriate to meet the objectives and requirements of the Forest Plan must be made. Where clearcutting is to be used, it must be determined to be the optimum harvest method.

No clearcutting is planned under any alternative. Even-aged silvicultural systems would be used in each of the action alternatives to varying degrees. Alternatives B and C would utilize these systems over a substantial number of acres in order to regenerate the sites with desirable, long-lived, early seral tree species. Alternative D would conduct a much smaller amount of even-aged silvicultural treatment (only the shelterwood removal harvests where regeneration has already been established in the understory). All of the even-aged treatments in the action alternatives are appropriate to meet the project objectives discussed in Chapter I of this EIS, and the timber and vegetation management practices outlined in the Forest Plan goals, objectives, management area direction and practices (Forest Plan, Appendix A).

Appendix D – Wildlife Information

This appendix discusses species and elements of wildlife habitat that were analyzed for this project, but did not warrant inclusion in the main body of the EIS.

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 Fish and Wildlife Service, 1987. Tucker, P. A., D. L. Davis, and R. R. Ream. 1990)

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 Fish and Wildlife Service, 1987). Since the late 1880s, substantial declines in numbers of wolves resulted from control efforts to reduce livestock and big game depredations. By the 1940s, as a result of hunting, shooting and poisoning, 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 the Interstate 90 Federal highway 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.

N.C. Lindsley recorded in his journal in 1889 that he trapped and hunted in the Pend Oreille drainage just west of the assessment area, harvesting 40 wolves. His one-year take was greater than the entire current wolf population in this area. There are records of wolf packs in the Idaho Panhandle in 1952 and 1953 (Hansen).

Existing Condition

The Chips Ahoy project area 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, C. M. and K. Laudon, 1998). Reported sightings and evidence of gray wolves within the Priest River sub-basin and surrounding areas are fluctuating annually. Direct observations and observation of wolf sign have occurred near the project area since 1991. The most recent observation of wolf sign occurred in November 2003, when possible tracks were observed near Forest Road 333. Two reports of wolves were documented immediately south of the project area in July and again in August of 2003. One of the reports involved two animals which were observed traveling together. In December 2003 two reports of wolves were received from approximately 9 miles southwest of the project area. One of the reports was of four wolves chasing down a deer and another was of two wolves. Both reports were from hunters in the area and were considered reliable but remain unconfirmed. Sightings in north Idaho and northeastern Washington, to date, 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 Priest Lake 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, B. B., tech. 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, moose and elk. Consequently, a sufficient year-round food source would be maintained for any wolves that may utilize the project area. Also, reductions in road densities (see Chapter 2 alternative descriptions) would decrease vulnerability of wolves as well as prey species.

Thus, activities that are associated with any of the proposed alternatives may affect wolves but are not likely to adversely affect wolves.

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, K.L., M.G. Raphael, and R.D. Dixon. 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, M. G., M. L. Morrison, and M. P. Yoder-Williams 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, E. D., M. C. Wackenhut, J. S. Altenbach, P. Bradley, P. Call, D. L. Genter, C. E. Harris, B. L. Keller, B. Lengus, L. Lewis, B. Luce, K. W. Navo, J. M. Perkins, S. Smith, and L. Welch. 1999). In most cases, their behavior appears 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, T. H. and R. A. Martin. 1982).

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

Reference Condition

Townsend's big-eared bats occur throughout much of the western North America, from British Columbia to Mexico, and eastward to Texas (Pierson, et.al. 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.

Existing Condition

Within the affected area of the Chips Ahoy project there is one known abandoned mine, the Last Chance Mine. This mine was surveyed for bats in 2001 and detected several bats were foraging within the vicinity of the adit. Surveyors indicated that these bats were most likely *Myotis sp.* and *Eptesicus fuscus*. No Townsend's big-eared bats were detected.

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 (Pierson, et.al. 1999) suggests to avoid disturbance during critical periods (e.g. maternity roosts, hibernacula) that a 0.25-mile radius, "no activity" buffer be established around mines. During harvest activities, a 500-foot buffer would be established around the entrance to a mine/adit.

Since Townsend's bats are not present and project related activity would not occur within the vicinity of the Last Chance Mine adit, no further analysis and discussion is necessary.

Design criteria, which is included as part of each proposed alternative would protect habitat for the Townsend's big-eared bat if it is discovered. If any potential habitat is discovered during implementation of any project activities, an evaluation of its potential as habitat would take place and any appropriate protection measures would be implemented if necessary.

Wolverine

Wolverines are low density, wide-ranging species that are 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, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech. eds.. 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, J. P. 1996). Ruggiero 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 (Ruggiero et al. 1994). 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, J.P. 1996). A recent study in Idaho found that wolverine selected den sites associated with large boulder talus in high elevation, subalpine cirque basins (Copeland, J.P. 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 summer of 2003 a wolverine was observed near Dubius Creek, 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 a highly roaded portion of the drainage, in an environment that makes wolverine presence untenable or undesirable. There are no high elevation cirque basins or other 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.

None of the proposed alternatives would impact any areas identified as 'refugia' for wolverine, so the likelihood of human/wolverine interactions and subsequent mortality risk would remain the same. Ungulate populations are at or near all time highs (Compton, B. B., tech. Editor. 1999), so foraging habitat does not appear to be limiting to wolverines. Based on these factors, no measurable 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 overwinter and shelter in underground caverns, or more commonly in rodent burrows. Adults may move more than four kilometers away from water after breeding and can remain away from surface water for relatively long periods of time. Juveniles 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 what proportion of their suitable habitat is occupied. 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 road cuts can be a barrier to toads moving between seasonal habitats; however, roads can also provide a barrier-free travel corridor, which then carries an inherent risk of 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 Priest Lake Ranger District. They are known to breed within all but the highest elevations of the Priest Lake drainage. 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 roads, 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 few known records or observations of boreal toads within the Chips Ahoy project area, it is assumed that boreal toads are common within the Upper West Branch drainages as they are within the rest of the Priest Lake drainage.

The proposed treatment areas in the Chips Ahoy project do not provide breeding habitat, although other portions of the Upper West Branch, Goose Creek and Consalus Creek drainages may provide breeding habitat. Implementation of the Inland Native Fish Strategy (INFS) and Best Management Practices (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 slight, temporary increase in road density as a result of this project, but the increases would not occur within the vicinity of breeding habitat so mortality risk would not increase. However, the end result of the proposed action will be a reduction in road density. For these reasons, the Chips Ahoy project may impact boreal toad but is not likely to affect overall viability or result in the need for federal listing. 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 throughout the Idaho Panhandle National Forests, but have not been recorded in the Selkirk Mountains, or the Priest Lake Ranger District; this is believed to be due to inappropriate geology. Where the salamander has been investigated elsewhere, it has been found to be locally abundant but limited to appropriate microhabitats within its limited range.

Existing Condition

No known suitable salamander habitat is present (live stream edges and seeps/springs) and there are no known occurrences of Coeur d'Alene salamanders within the Chips Ahoy project area. If the salamander were discovered later, any impacts to these areas would be avoided through treatment area design and application of INFS standards. Therefore, the Chips Ahoy 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 20 years northern leopard frog populations have declined or have been lost from large portions of their range. Suggested causes for declines in 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 Bonner County, despite surveys in 1999 specifically to investigate suitable habitat and suspected historical sites. Within Pend Oreille County the last recorded observation was in the 1960s. Surveys within Pend Oreille County, Washington in 1995 were unable to relocate previous populations. 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. Because of these protection measures and the lack of suitable habitat, 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, N., tech. Editor. 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, T. W., T. M. Campbell III, and T. N. Hauptman. 1989).

American marten was selected by the IPNF Forest Plan as a management indicator species to represent 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 Priest Lake Ranger District. 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.

Moose

Moose are the largest member of the deer family. Moose breed from early September to November and deliver one to three calves in May or June. Moose live mostly solitary lives, and die from disease, starvation, hunting, or predation by wolves and occasionally, grizzly bears.

The moose lives almost solely on twigs and shrubs during the winter months. In summer, this diet is varied with leaves, some upland plants, and water plants in great quantity where available.

Reference Condition

There is very little reference to moose prior to settlement in the Priest Lake drainage. Within the Priest Lake area, moose were first documented in the Kalispell drainage in 1956 by the State of Washington. Kalispell Creek is about eight miles north of the Chips Ahoy project area.

Their occurrence within the Kalispell Drainage was likely linked to the abundance of high quality browse, which was the product of the wildfires that burned in the 1920s and 1930s. Subsequent protection from hunting and wolf control programs may have contributed to increased numbers; but, suppression of forest fires probably was the most important factor, since moose here depend on mature fir forests for winter survival. In 1972, the State of Washington initiated the first hunting permits for two moose; both permits for the Kalispell drainage.

Because of the interest and importance of the Kalispell watershed for moose populations within the state of Washington, the area was designated for management as important moose winter range during the development of the Idaho Panhandle National Forests Plan (Forest Plan, Appendix L, Indicator Species Selection Criteria). Since 1987, moose populations within the state of Washington have expanded southward as far as Mt Spokane and westward into Ferry County.

Existing Condition

Moose populations within Idaho and Washington have been increasing over the last several decades. Recent surveys by the Idaho Department of Fish and Game indicate that moose populations are higher within the Priest Lake drainage and Northern Idaho than originally believed. Thus, the department increased harvest levels in response.

Within the Priest Lake drainage, areas designated as moose winter range include Kalispell Basin, Granite Creek and a portion of the Upper Priest River drainage – all areas to the north of the Chips Ahoy project area. Although the eastern portion of the project area is designated management for big game, the target species is white-tailed deer, not moose. Management for moose winter range habitat would differ from that for white-tailed deer. Management of white-tailed deer winter range within the Priest Lake drainage emphasizes management for winter cover (IPNF, 1987. Forest Plan). Management for moose winter habitat emphasizes forages or early successional habitats.

While the proposed action may cause a temporary disturbance to resident moose, it would not result in a measurable change to the amount of available forage or quality winter cover. There will be no net increase of drivable roads in the project area. Therefore, the Chips Ahoy project is not expected to impact moose or their habitat. No further analysis and discussion is necessary.

Snag Habitat

Snags (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, E. L., C. G. Parks, and T. R. Torgersen. 1997). Many forest-dwelling animals use snags 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 ranging 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 Chips Ahoy project area has been strongly influenced by timber harvest, 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 (Morrison, M. L. and M. G. 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 (Thomas, Jack Ward, tech. ed. 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).

Appendix E - Literature Cited

Acheson, Stanich, and Story. 2000. Describing Air Resource Impacts From Prescribed Fire Projects In NEPA Documents for Montana and Idaho in Region 1 and Region 4. USDA Forest Service. November, 2000.

Allen, Michael F. 1991. The ecology of mycorrhizae. Cambridge University Press. Cambridge, U.K.

Anderson, Henry W. 1976. Fire Effects on Water Supply, Floods and Sedimentation. Proceedings from Annual Tall Timbers Fire Ecology Conference No. 15. pp. 249-260.

Arno, Stephen F. and Dan H. Davis. 1980. Fire History of Western Redcedar/Hemlock Forests in Northern Idaho. Paper presented at the Fire History Workshop, University of Arizona, Tucson, October 20-24, 1980. pages 21-26.

Arno, Stephen F. 1996. The Concept: Restoring Ecological Structure and Process in Ponderosa Pine Forests. *In:* The Use of Fire in Forest Restoration, USDA Forest Service Intermountain Research Station. Gen. Tech. Rep. INT-GTR-341. p. 37.

Bash, J, C. Berman, and S. Bolton. 2001. Effects of turbidity and suspended solids on salmonids. Center for Streamside Studies. University of Washington.

Belt, G.H., J.O. O'Laughlin, and T. Merrill. 1994. Design of forest riparian buffer strips for the protection of water quality: Analysis of scientific literature. Idaho Forest, Wildlife, Range Policy Group, Rept. 8, University of Idaho. Moscow, Idaho. 35 pp.

Benda, L. and T. Dunne. 1997. Stochastic forcing of sediment supply to channel networks from landsliding and debris flows. Water Resources Research. Vol. 33, No.12, Pgs. 2849-2863.

Benda, L. and T. Dunne. 1997a. Stochastic forcing of sediment routing and storage in channel networks. Water Resources Research. Vol. 33, No. 12, Pgs 2865-2880.

Beschta, R.L. 1978. Long-term patterns of sediment production following road construction and logging in the Oregon Coast Range. Water Resources Research. 14(6): 1011-1016.

Bilby, Robert E.; Kathleen Sullivan and Stanley H. Duncan. 1989. The generation and fate of road-surface sediment in forested watersheds in southwestern Washington. In: Forest Science 35(2): 453-468.

Bilby, R.E. and G.E. Likens. 1980. Importance of organic debris dams in the structure and function of stream ecosystems. In: Ecology 61:5: 1107-1113.

Bilby R.E. and J.W. Ward. 1989. Changes in characteristics and function of woody debris with increasing stream size in western Washington. Transactions of the American Fisheries Society. 118: 368-378.

Bisson, P.A. and J.R. Sedell. 1982. Salmonid populations in streams in clearcut vs. old growth forests of western Washington. In: Meehan, W.R., T.R. Merrall, J.W. Matthews Eds. Fish and Wildlife Relationships in Old-Growth Forests. Proceedings of a Symposium. Amer. Inst. Fish. Res. Bios. pp 121-130.

Bruna, John, 1994. Best Management Practices for Nutrition. Intermountain Forest Tree Nutrition Cooperative, Idaho Dept of Lands, Coeur d'Alene, Idaho, pp. 134-144. Annual meeting of Intermountain Forest Tree Nutrition Cooperative, April 12, 1994. Gonzaga University, Spokane, WA.

Bull, E. L., R. S. Holthausen, and M. G. Henjum. 1990. Techniques for monitoring pileated woodpeckers. Gen. Tech. Rep. PNW-GTR-269. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. 13 pp.

Bull, E. L., C. G. Parks, and T. R. Torgersen. 1997. Trees and logs important to wildlife in the Interior Columbia River Basin. Gen. Tech. Rep. PNW-GTR-391. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. 28 pp.

Burns, Russell M., and Barbara H. Honkala, tech. Cords. 1990. Silvics of North America: 1. Conifers. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. Vol. 1, 675 p.

Burroughs, E.R.; Watts, F.J.; King, J.G.; Haber, D.F.; Hansen, D. and G.Flerchinger. 1983. Measurement of the relative effectiveness of rocked roads and ditches in reducing surface erosion, Rainy Day Road, Nez Perce National Forest, Idaho. 34 p.

Burroughs, E. and others. 1985. Relative effectiveness of rocked roads and ditches on reducing surface erosion. In: Proceedings of the twenty-first annual engineering geology and soils engineering symposium, University of Idaho, Department of Civil Engineering, Moscow, Idaho. pp. 251-263.

Burroughs, E.R. and J.G. King. 1989. Reduction of soil erosion on forest roads. USDA Forest Service, Intermountain Research Station GTR-INT-264. pp. 18.

Bursik, Robert J. and Robert K Moseley. 1995. Ecosystem conservation strategy for Idaho panhandle peatlands. Idaho Department of Fish and Game. Boise, Idaho.

Byler, James W. and Sara Zommer-Gorve. 1990. A forest health perspective on interior Douglas-fir management. In: Interior Douglas-fir: the species and its management. Washington State University, Department of Natural Resource Sciences, Cooperative Extension.

Cacek, Charles C. 1989. The relationship of mass wasting to timber harvest activities in the Lightning Creek basin. Masters Thesis, Eastern Washington University.

Chamberlin, T.W., R.D. Harr, and F.H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. In: William R. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19:181-205. Bethesda, Maryland.

Chatwin, S.C., D.E. Howes, J.W. Schwab, D.N. Swanston. 1994. A Guide for Management of landslide - Prone Terrain in the Pacific Northwest, 2nd edition. Land Management Handbook Number 18 (ISSN 0229-1622), British Columbia Ministry of Forests in cooperation with the US Forest Service.

Clark, L. R. and R. N. Sampson. 1995. Forest ecosystem health in the inland west: A Science and policy Reader. Forest Policy Center, Washington D.C. 37 pp.

Clark, T. W., T. M. Campbell III, and T. N. Hauptman. 1989. Demographic characteristics of American marten populations in Jackson Hole, Wyoming. Great Basin Naturalist 49:587-596.

Cline, Richard G., Harold F. Haupt and Gaylon S. Campbell. 1977. Potential water yield response following clearcut harvesting on north and south slopes in northern Idaho. USDA Forest Service Research Paper INT-191. Intermountain Forest and Range Experiment Station Forest Service, US Department of Agriculture. 16 pgs.

Cobb, Jill. 2004. Discussion with the project botanist concerning the potential for indirect effects of proposed commercial thinning on paludified forest and a population of northern starflower (*Trientalis arctica*). February 6, 2004.

Compton, B. B., tech. editor. 1999. White-tailed deer, mule deer and elk management plan. Idaho Department of Fish and Game, Boise, ID.

Cook, M.J. and J.G. King. 1983. Construction cost and erosion control effectiveness of filter windrows on fill slopes. USDA Forest Service, Intermountain Forest and Range Experiment Station. Research Note INT-335. 5 pp.

Cooper, Stephen et al. 1991. Forest habitat types of north Idaho: a second approximation. Gen. Tech. Rep. INT-GTR-236. USDA Forest Service Intermountain Research Station. Ogden, UT. 135 pp.

Copeland, J. P. 1996. Biology of the wolverine in Central Idaho. M.S. Thesis, University of Idaho, Moscow, ID. 138 pp.

Copstead, Ronald L., David Kim Johansen and Jeffry Moll. 1998. Water/road interaction: introduction to surface cross drains. USDA Forest Service San Dimas Technology and Development Center. San Dimas, California.

Council on Environmental Quality. 1986. Regulations for implementing the procedural provisions of the National Environmental Policy Act. 40 CFR Parts 1500-1508. Washington D.C. 45 pp.

Crum, Howard. 1992. A focus on peatlands and peat mosses. University of Michigan Press. Ann Arbor, Michigan. pp. 37-39.

Duncan, S.H.; R.E. Bilby; J.W. Ward and J.T. Heffner. 1987. Transport of road surface sediment through ephemeral stream channels. In: Water Resources Bulletin 23(1): 113-119.

Dunne, T. and L. Leopold. 1978. Water in environmental planning. W. H. Freeman and Company. pg 17.

Everest, F.H. and J.R. Sedell. 1984. Evaluating effectiveness of stream enhancement projects. In: Thomas J. Hassler Ed., Proceedings: Pacific Northwest Stream Habitat Management Workshop. Humboldt State University. pp 246-256.

Fins, L., J. Byler, D. Ferguson, A. Harvey, M.F. Mahalovich, G.McDonald, D. Miller, J. Schwandt, and A. Zack. 2001. Return of the giants.-restoring white pine ecosystems by breeding and aggressive planting of blister rust-resistant white pines. Station Bulletin 72. University of Idaho. Moscow, Idaho 20 pp.

Flanagan, S.A., M.J. Furniss, T.S. Ledwith , S. Thiesen, M. Love, K. Moore, and J. Ory. 1998. Methods for inventory and environmental risk assessment of road drainage crossings. USDA Forest Service San Dimas Technology and Development Center. San Dimas, CA.

Foltz, R.B. and M.A. Truebe. 1995. Effect of aggregate quality on sediment production from a forest road. Proceedings of the 6th International Conference on Low-Volume Roads, 1995 June 25-29, Minneapolis, MN. Washington, DC: National Academy Press, 1995: p. 49-57.

Fraley, J.J. and B.B. Shepard. 1989. Life history, ecology and population status of migratory bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. In: Northwest Science Vol. 63, No. 4.

Froehlich, H.A., Aulerich, D.E. and Curtis, R. 1981. Designating skid trail systems to reduce soil impacts from tractor logging machines. Forest Research Lab., School of Forestry, Research Paper 44. Oregon State University, Corvallis, Oregon.

Furniss, M., M. Love, and S. Flanagan. 1997. Diversion potential at road stream crossings. USDA Forest Service Technology and Development Program. Report 9777 1814-SDTDC. 12 pages.

Furniss, M., T. Ledwith, M. Love, B. McFadin and S. Flanagan. 1998. Response of road stream crossings to large flood events in Washington, Oregon and Northern California. USDA Forest Service Technology and Development Program. Report 9877 1806-SDTDC, 14 pages.

Garrett, K.L., M.G. Raphael, and R.D. Dixon. 1996. White-headed Woodpecker: *Picoides albolarvatus*. The Birds of North America, No. 252. The American Ornithologist's Union, Washington D.C. 24 pp.

Garrison, M.T., and J.A. Moore. 1998. Nutrient management: a summary and review. In: Intermountain Forest Tree Nutrition Cooperative Supplemental Report 98:5.

Goetz, F. 1989. Biology of the bull trout, *Salvelinus confluentus,* a literature review of bull trout. Eugene, Oregon. USDA Forest Service, Willamette National Forest. 53 pp. *[as cited in]* Rieman, B. E. and J. D. McIntyre. 1993. Demographic and habitat requirements of conservation General Technical Report INT-302.

Gorman, O. T. and J. R. Karr. 1978. Habitat structure and stream fish communities. Ecology 59(3): 507-515.

(Graham et al. 1994). Retaining large woody debris and organic matter is important to maintaining this productive layer

Graham, Russell T, R. L. Rodriquez, K. M. Paulin, R. L. Player, A. P. Heap, and R. Williams. 1999. The northern goshawk in Utah: habitat assessment and management recommendations. Gen. Tech. Rep. RMRS-GTR-22. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 48pp.

Green, P.; Joy, J.; Sirucek, Hann; W., Zack, A; and Naumann, B. 1992. Old Growth Forest Types of the Northern Region. USDA, Forest Service, Northern Region, R-1 SES 4/92.

Groves, C. R., E. F. Cassirer, D. L. Genter, and J. D. Reichel. 1996. Coeur d’Alene salamander (*Plethodon idahoensis*). Natural Areas Journal 16:238-247.

Gucinski, Hermann, Michael J.l Furniss, Robert R. Ziemer and Martha H. Brookes. 2001. Forest roads: a synthesis of scientific information. General Technical Report PNW-GTR-509. USDA Forest Service Pacific Northwest Research Station. Portland, OR. 120pp.

Harpel, Judy. 2002. Personal communication between Gifford Pinchot National Forest bryologist and IPNF North Zone botanist regarding habitat requirements and abundance of *Buxbaumia viridis* in western Washington.

Harr R. Dennis. 1980. Streamflow after patch logging in small drainages within the Bull Run Municipal Watershed, Oregon. USDA Forest Service. Pacific Northwest Forest and Range Experiment Station. Res. Paper: PNW-268. March 1980. 17 pages

Haupt, H.F. 1959. Road and slope characteristics affecting sediment movement from logging roads. Journal of Forestry. 57(5): 329-332.

Haupt, Harold F. 1968. The generation of spring flows by shorterm meterological events. Bulletin of the International Association of Scientific Hydrology, XIII, 4-12/1968.

Hayward, G. D. and R. E. Escano. 1989. Goshawk nest-site characteristics in western Montana and Northern Idaho. The Condor 91:476-479.

Heinemeyer, K.S. 1993. Temporal dynamics in the movements, habitat use, activity, and spacing or reintroduced fishers in northwestern Montana. M.S. thesis, University of Montana, Missoula. 158 pp.

Heinemeyer, and J.L. Jones. 1994. Fisher biology and management: A literature review and adaptive management strategy. USDA Forest Service Northern Region, Missoula, Montana. 108 pp.

Hejl, S. J. 1994. Human-induce changes in bird populations in coniferous forests in western North America during the past 100 years. Studies in Avian Biology No. 15: 232-246.

Henjum, M.G.; Karr, J.R.; Bottom, D.L. [and others]. 1994. In: Karr, J.R.; Chu, E.W., eds. Interim protection for late-successional forests, fisheries, and watersheds. National Forests East of the Cascade Crest, Oregon and Washington, Eastside Forests Scientific Society Panel. Bethesda, MD. The Wildlife Society: 129-168.

Hibbert, Alden R. 1965. Forest Treatment Effects on Water Yield. International Proceedings on Forest Hydrology. Proceedings of a National Science Foundation Advanced Science Seminar held at The Pennsylvania State University, Pennsylvania. August 29 through September 10, 1965. pp. 527-543.

Hungerford, R.D. 1984. Native shrubs: suitability for revegetating road cuts in northwestern Montana. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. Research Paper INT-331. 13 pp.

Hutto, Richard L. 1995. USDA Forest Service Northern Region Songbird Monitoring Program Distribution and Habitat Relationships. USDA Forest Service contract #R1-95-05. Second Report. Division of Biological Sciences. University of Montana. 21 pp.

ICDC. 2004. Element Occurrence Records. Idaho Department of Fish and Game Conservation Data Center. Boise, Idaho. An electronic database.

Idaho Partners in Flight. 2000. Idaho bird conservation plan. Version 1.0.

IDEQ 2001. Idaho's 2000 Forest Practices Water quality Audit. Final Report. Idaho Department of Environmental Quality. Boise, Idaho.

Inland Native Fish Strategy (INFISH). 1995. Environmental Assessment. Intermountain, Northern, and Pacific Northwest Regions. USDA Forest Service.

Intermountain Forest Tree Nutrition Cooperative (IFTNC) have a copy

Jakober, M.J. 1995. Autumn and winter movement and habitat use of resident bull trout and westslope cutthroat trout in Montana. Master's Thesis. Montana State University. Bozeman, MT.

Jankovsky-Jones, Mabel and Desiree Graham. 2001. Predicting the distribution of potential habitat for *Spiranthes diluvialis* on National Forests in Idaho by fifth field watersheds: phase 3 - develop a predictive model. Unpublished technical report to Idaho Fish and Game Conservation Data Center. Boise, Idaho.

Jones, J. L. 1991. Habitat use of fisher in north central Idaho. Unpublished M.S. Thesis, University of Idaho, College of Graduate Studies. May 1991.

Karr, J.P. and D.R. Dudley. 1981. Ecological perspectives on water quality goals. Env. Man. 5: 55-68.

Karr, J. R. and K. E. Freemark. 1983. Habitat selection and environmental gradients: dynamics in the "stable" tropics. Ecology 64(6): 1481-1494.

Ketcheson, G. and W. Megahan. 1996. Sediment production and downslope sediment transport from forest roads in granitic watersheds. Res. Pap. INT-RP-486. Ogden, UT: USDA Forest Service, Intermountain Research Station. 11pp.

King, J.G. 1993. Streamflow and sediment yield responses to forest practices in north Idaho. Interior cedar-hemlock-white pine forests: ecology and management: symposium proceedings, March 2-4, 2003, Spokane, Washington, USA. Pullman, Wash.: Washington State University, 1994 p 213-220.

Kirchner, James W., Robert C. Finkel, Clifford S. Riebe et al. 2001. Mountain erosion over 10 yr., 10 k.y. and 10 m.y. time scales. In: Geology 29(7): 591-594.

Kochenderfer, J.N. Helvey J.D. 1987. Using gravel to reduce soil losses from minimum standard forest roads. Journal of Soil and Water Conservation. 42(1): 46-50.

Klockman, A.K. 1990. The Klockman Diary. The quest for North Idaho's legendary Continental Mine.

Koehler, G.M. and K.B. Aubrey. 1994. Lynx. *In* Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech. eds. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. Gen. Tech. Rep. RM-254. Ft. Collins CO: USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 pp.

Koehler, G. M. and J. D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry. 5 pp.

(Krag 1991, p.64).Some units could be logged during winter months, and if so there would be reduced effects of compaction and displacement than that which was estimated in the analysis

Kunz, T. H. and R. A. Martin. 1982. Plecotus townsendii. *In*: Mammalian Species No. 175. The American Society of Mammalogists. Pp. 1-6.

Landsberg, Johanna. 1992. Effects of disruption of fire regimes on site productivity. In: Fire in Pacific Northwest Ecosystem: Exploring Emerging Issues. pp. 8-10.

Lawton, Elva. 1971. Moss flora of the Pacific Northwest. Hattori Botanical Laboratory. Nichinan, Miyazaki, Japan.

Layser., E. F. 1978. Grizzly bears in the Southern Selkirk Mountains. Northwest Science. Vol.(52) 2 pp77-91.

Leiberg, John B. 1899. The Priest River Reserve. In: Nineteenth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1897-98, Charles D. Wolcott, Director: Part V -- Forest Reserves, Henry Gannett, Chief of Division of Geography and Forestry. Washington, DC: U.S. Government Printing Office. Pgs. 217-252.

Leopold, L.B., M.G. Wolman, and J.P. Miller. 1964. Fluvial processes in geomorphology. Dover Publications, Inc. 522 pp.

Leptich, D. J. and P. Zager. 1991. Road access management effects on elk mortality and population dynamics. *In*: Christensen, A. G., L. J. Lyon, and T. N. Lonner; comps. Proceedings: elk vulnerability symposium. 1991. Montana State University, Bozman, MT. 174-181 pp.

Lesica, Peter. 1997. Demography of the endangered plant *Silene spaldingii* (Caryophyllaceae) in northwest Montana. Madrono 44(4):347-358.

Lesica, Peter. 1999. Effects of fire on the demography of the endangered, geophytic herb *Silene spaldingii* (Caryophyllaceae). American Journal of Botany 86(7): 996-1002.

Lichthardt, J. 1997. Revised report on the conservation status of *Silene spaldingii* in Idaho. Idaho Department of Fish and Game Conservation Data Center. Boise, Idaho. Unpublished technical report.

Luce, Charles H., 1997. Effectiveness of road ripping in restoring infiltration capacity of forest roads. Restoration ecology; Vol. 5, no. 3 (Sept. 1997): p. 265-270.

MacDonald, L.H. and J.A. Hoffman. 1995. Causes of peak flows in northwestern Montana and northeastern Idaho. Water Resources Bulletin 31(1): 79-94.

Mack, C. M. and K. Laudon. 1998. Idaho wolf recovery program: recovery and management of gray wolves in Idaho. Progress Report 1995-1998. Nez Perce Tribe, Department of Wildlife Management, Lapwai, ID. 28 pp.

Markle, D.F., D.L. Hill Jr., and C.E. Bond. 1996. Sculpin identification workshop and working guide to freshwater sculpins of Oregon and adjacent areas. Revision 1.1. Department of Fisheries and Wildlife. Oregon State University. Corvallis, Oregon. Page 37.

Maxell, B. E. 2000. Management of Montana's amphibians: a review of factors that may present a risk to population viability and accounts on the identification, distribution, taxonomy, habitat use, natural history, and the status and conservation of individual species. Report to USFS Region 1, Order Number 43-0343-0-0224. University of Montana, Wildlife Biology Program. Missoula, Montana. 161 pp.

McCaughey, W.W., P.E. Farnes, and K.J. Hansen. 1997. Historic role of fire in determining annual water yield from Tenderfoot Creek Experimental Forest, Montana, USA. 65th annual meeting, Western Snow Conference, May 4-8, 1997, Banff, Alberta, Canada: joint meeting with the 54th annual Eastern Snow Conference.

Merriam, C.H. 1992. Distribution of grizzly bears in the U.S. Outdoor Life, December. pp. 405-406

McGarigal, Kevin; Marks, Barbara J. 1995. FRAGSTATS: spatial pattern analysis program for quantifying landscape structure. Gen. Tech. Rep. PNW-GTR-351. Portland, OR: USDA, Forest Service, Pacific Northwest Research Station. 122p.

McIver, James D. and Lynn Starr. 2000. Environmental effects of postfire logging: literature review and annotated bibliography. USDA Forest Service Pacific Northwest Research Station Gen. Tech. Rep. PNW-GTR-486.

Megahan, W.F. 1983. The hydrologic effects of clearcutting and wildfire on steep granitic slopes in Idaho. Water Resources Research 19(3).

Megahan, Walter F. 1985. Effects of forest roads on watershed function in mountainous areas. IN: Proceedings of the Symposium on Environmental Geotechnics and

Problematic Soils and Rocks: Environmental Geotechnics and Problematic Soils and Rocks: p. 335-348.

Megahan, Walter F., John P. Potyondi and Kathleen A. Seyedbagheri. 1992. Best management practices and cumulative effects from sedimentation in the South Fork Salmon River: an Idaho case study. pp. 401-414.

Megahan, W., J. King, and K. Seyedbagheri. 1995. Hydrologic and erosional responses of a granitic watershed to helicopter logging and broadcast burning.

Megahan, W.F. and G.L. Ketcheson. 1996. Predicting downslope travel of granitic sediments from forest roads in Idaho. American Water Resources Association. Water Resources Bulletin, Vol. 32, No. 2. April 1996.

Meisner, J.D. 1990. Effect of climatic warming on the southern margins of the native range of brook trout, *Salvelinus fontinalis*. Canadian Journal of Fisheries and Aquatic Sciences. 47: 1065-1070.

Mesa, Matthew G. 1991. Variation in feeding, aggression, and position choice between hatchery and wild cutthroat trout in an artificial stream. Transactions of the American Fisheries Society. 120:723-727.

MOA, North Idaho Smoke Management Memorandum of Agreement, June 1990, and the Montana Smoke Management Memorandum of Agreement, July 1978.

Morrison, M. L. and M. G. Raphael. 1993. Modeling the dynamics of snags. Ecological Applications: 3(2), pp. 322-330.

Moseley, Robert K. 1999. Predicting the distribution of potential habitat for *Spiranthes diluvialis* on National Forests in Idaho: phase 1 - habitat profile. Unpublished technical report to Idaho Fish and Game Conservation Data Center. Boise, Idaho.

Neuenschwander, L.F., J.W. Byler, A.E. Harvey, G.I. McDonald, D.S. Ortiz, H.L. Osborne, G.C. Snyder, and A. Zack. 1999. White pine and the American West: A vanishing species. Can we save it? USDA Forest Service General Technical Report RMRS-GTR-35. Ft. Collins, CO:Rocky Mountain Research Station.

Niehoff, Gerald. 1985. Technical guide to determine potential soil damage by prescribed burning and wildfire. Unpublished paper available from Idaho Panhandle National Forests Soil Scientist, Coeur d'Alene, Idaho. 6 pages.

Niehoff, Gerald. 2002. Soil NEPA analysis process and source of soil disturbance model coefficients. Unpublished report available from Idaho Panhandle National Forests Supervisors Office, Coeur d'Alene, Idaho.

Numerous authors. 2000. Ecological effects of roads. In: Conservation Biology. Vol. 14, No.1. February 2000.

Nussbaum, R. A., E. D. Brodie Jr., and R. M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. University of Idaho Press, Moscow, ID.

O'Connor, T. and M. Hillis. 2001. Conservation of post-fire habitat, black-backed woodpeckers and other woodpecker species on the Lolo National Forest. USDA Forest Service, Missoula, MT.

Oliver, C. 1992. A landscape approach. Achieving and maintaining biodiversity and economic productivity. Journal of Forestry. Pp. 20-25.

Overton, C.K., S.P. Wollrab, B.C. Roberts, and M.A. Radko. 1997. R1/R4 Fish and Fish Habitat Standard Inventory Procedures Handbook. General Technical Report INT-GTR-346. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

Patten, R. 1989. Watershed Response Model for Forest Management, WATBAL. Technical Users Guide, revised November 15, 1999.

Patton, T., and R. Escano. 1990. Marten Habitat Relationships. *In* Warren, N., tech. editor. Old growth habitats and associated wildlife species in the northern Rocky Mountains. Northern Region Report R1-90-42: USDA Forest Service, Missoula, MT. 47 pp.

Peck, J.H., C.J. Peck, D. R. Farrar. 1990. Influences of life history attributes on formation of local and distant fern populations. American Fern Journal 80(4): 126-142.

Penny, Diane. 1995. Monitoring *Botrychium lanceolatum* subsp. *lanceolatum* in Hanna Flats Cedar Grove. Priest Lake Ranger District, Idaho Panhandle National Forests. Unpublished technical report.

Penny, Diane. 1996. Monitoring effects of thinning and slash handpiling on *Lycopodium dendroideum*. Priest Lake Ranger District, Idaho Panhandle National Forests. Unpublished technical report.

Pierson, E. D., M. C. Wackenhut, J. S. Altenbach, P. Bradley, P. Call, D. L. Genter, C. E. Harris, B. L. Keller, B. Lengus, L. Lewis, B. Luce, K. W. Navo, J. M. Perkins, S. Smith, and L. Welch.

1999. Species conservation assessment and strategy for Townsend's big-eared bat (*Corynorhinus townsendii townsendii* and *Corynorhinus townsendii pallescens*). Idaho Conservation Effort, Idaho Department of Fish and Game, Boise, ID.

Pfingsten, B. 1983. Evaluating wild ungulate habitat: use of forate quality as a relative index. Western Wildlands. 9: 24-27.

Powell, R .A. 1982. The fisher: life history, ecology, and behavior. University of Minnesota Press, Minneapolis.

Powers, R.F. 1990. Are we maintaining the productivity of forest lands? Establishing guidelines through a network of long-term studies. pp.70-81. *In*: Harvey, A.E and L.F. Neuenschwander (Eds.). Proceedings—Management Productivity of Western Montane Soils. Boise, Idaho, April 10-12. USDA Forest Service Intermountain Research Station and University of Idaho, Moscow, Idaho.
Pratt, K.L. 1985. Pend Oreille trout and char life history study. Idaho Department of Fish and Game in cooperation with Lake Pend Oreille Idaho Club. Boise, Idaho.

Quigley, Thomas M. and Sylvia J. Arbelbide, tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins. Volume III. USDA Forest Service Gen. Tech. Rep. PNW-GTR-405. Pacific Northwest Research Station. Portland, OR.

Quigley, Thomas M.; Richard W. Haynes; and Russell T Graham, Technical Editors. 1996. Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of Klamath and Great Basins. General Technical Report PNW-GTR-382. USDA, Forest Service, Pacific Northwest Research Station. 303 pages.

Raphael, M. G., M. L. Morrison, and M. P. Yoder-Williams. 1987. Breeding bird populations during twenty-five years of post-fire succession in the Sierra Nevada. Condor 89: 614-626.

Reel, S., L. Schassberger and W. Ruediger. 1989. Caring for our natural community. USDA Forest Service. Northern Region Wildlife and Fisheries publication

Reinhardt, E.D., R.E. Keane, J.K. Brown, 1997. First Order Fire Effects Model, FOFEM Users Guide. IMT-GTR-344. USFS Intermountain Station, Missoula, MT.

Rey-Vizgirdas, Edna. Endangered and threatened wildlife and plants: 90-day finding for a petition to add *Botrychium lineare* (slender moonwort) to the list of threatened and endangered species. 50 CFR part 17. Federal Register. May 10, 2000.

Reynolds, R. T., R. T. Graham, M. H. Reiser, R. L. Bassett, P. L. Kennedy, D. A. Boyce Jr., G. Goodwin, R. Smith, and E. L Fisher. 1991. Management recommendations for the northern goshawk in the southwestern United States. USDA Forest Service, Southwestern Region. 184 pp.

Reynolds, R. T., and B. D. Linkhart. 1992. Flammulated owls in ponderosa pine: pages 166-169 *in* Old-growth forests in the southwest and Rocky Mountain regions; proceedings of a workshop. USDA Forest Service Gen. Tech. Report RM-213.

Rice, Peter M. and Robert Sacco. 1995. Spotted knapweed response to burning - a brief review. Unpublished technical report. University of Montana. Missoula, Montana.

Rieman, B.E., and J.D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. General Technical Report INT-302. USDA Forest Service, Intermountain Research Station. Ogden, Utah. 38 pp.

Rieman, B. and K. Apperson. 1989. Status and analysis of salmonid fisheries: westslope cutthroat trout synopsis and analysis of fishery information. Job performance representative. Idaho Department of Fish and Game. Project F-73-R-11, Subproject No. 11, Job No. 1. Boise, Idaho. 113 pp. In: Iron Honey FEIS, Coeur d'Alene River Ranger District, IPNF.

Rosgen, D. L. 1996. Applied River Morphology. Wildland Hydrology Books. Pagosa Springs, CA. 352 pp.

Rothrock, personal communication. 2003. Discussion between Idaho DEQ and the project hydrologist regarding the timeline for developing the TMDL for the Upper West Branch. April 14, 2003.

Roy, K.D. 1991. Ecology of reintroduced fishers in the Cabinet Mountains of nortwest Montana. M.S. thesis, University of Montana, Missoula. 94 pp.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech. eds. 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. Gen. Tech. Rep. RM-254. Ft. Collins CO: USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 pp.

Samman, Safiya; Schwandt, John W.; Wilson, Jill L. 2003. Managing for Healthy White Pine Ecosystems in the United States to Reduce the Impacts of White Pine Blister Rust. Forest Service Report R1-03-118. Missoula, MT: Department of Agriculture, Forest Service. 10p.

Schlosser, I.J. 1982. Trophic structure, reproductive success, and growth rate of fishes in a natural and modified headwater stream. Can. J. Fish. Aquat. Sci. 39:968-978.

Schmidt, Wyman C., Raymond C. Shearer, and Arthur L. Roe. 1976. Ecology and silviculture of western larch forests. U.S. Department of Agriculture Technical Bulletin 1520. Washington, DC. 96 p.

Schwandt, J. W., M. A. Marsden and G. I. McDonald. 1994. Pruning and thinning effects on white pine survival and volume in northern Idaho. In: Baumgartner, D. M. et al., Eds. Interior cedar-hemlock forests: ecology and management. March 2-4, 1993. Washington State University Cooperative Extension. Spokane, Washington. Pp. 167-172.

Seyedbagheri, K.A. 1996. Idaho Forestry Best Management Practices: Compilation of research on their effectiveness. USDA Forest Service, Intermountain Research Station, Gen. Tech. Rep. INT-GTR-339. October 1996. 89 pages.

Shelly, J. Steven and Robert K. Moseley. 1988. Report on the conservation status of *Howellia aquatilis*, a Candidate Threatened Species. Montana Natural Heritage Program. Helena, MT. Pages 29-30.

Shepard, B. B., B. E. May, W. Urie and others. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarki lewsi*) in the United States: 2002.

Sims, Cort. 2002. Personal communication with forester David Cobb regarding how Native Americans may have influenced the forests at Priest Lake.

Smith, J.K., and W.C. Fischer. 1997. Fire Ecology of the Forest Habitat Types of Northern Idaho. USDA Forest Service Intermountain Research Station, Gen. Tech Rep. INT-GTR-383. Ogden, UT. pp. 10, 50-51, 56-57.

Spurr, S.H., and B.V. Barnes, 1980. Forest Ecology. John Wiley & Sons, New York, Chapter 16, pp 421-428 and 437-439.

Squires J. R. and R. T. Reynolds. 1997. Northern goshawk (*Accipiter gentilis*). *In*: The Birds of North America, No. 298 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington D.C.

Stage, A.R. 1957. Some runoff characteristics of a small forested watershed in Northern Idaho. USDA Forest Service, Intermountain Forest and Range Experiment Station. 27 pages.

State of Idaho. 1996. Governor Philip E. Batt's State of Idaho bull trout conservation plan. Boise, Idaho. July 1, 1996.

Swift, L. 1984. Gravel and grass surfacing reduces soil loss from mountain roads. Forest Science, Vol. 30, No. 3, pp. 657-670.

Thomas, Jack Ward, tech. ed. 1979. Wildlife habitats in managed forests – the Blue Mountains of Oregon and Washington. USDA Forest Service Agricultural Handbook No. 553. Page 137.

Thomas, J. W. and D. E. Toweill, Eds. 1982. Elk of North America - ecology and management. Wildl. Manage. Inst., Stackpole Books, Harrisburg, PA. 698 pp.

Troendle, C.A. 1987. The potential effect of partial cutting and thinning on streamflow from the subalpine forest. USDA Forest Service. Rocky Mountain Forest and Range Experiment Station. Research Paper RM-274 8 pages.

Tucker, P. A., D. L. Davis, and R. R. Ream. 1990. Wolves: identification, documentation, and population monitoring and conservation considerations. Northern Rockies Natural Resources Center, National Wildlife Federation. Missoula, MT. 27 pp.

USDA Forest Service. undated. WADA (WATSED Automated Data Assembler) User's Guide.

USDA Forest Service. 1981. Guide for Predicting Sediment Yields from Forested Watersheds. Northern Region and Intermountain Region; Soil and Water Management.

USDA Forest Service. 1983. The Northern Regional Guide. Northern Region, Missoula, MT.

USDA Forest Service. 1987. Forest Plan, Idaho Panhandle National Forests, Northern Region. Coeur d'Alene, ID.

USDA Forest Service. 1989. Caring for our natural community. Northern Region, Missoula, Montana.

USDA Forest Service. 1994. Conservation strategy for *Howellia aquatilis*. Flathead National Forest. USDA Forest Service Northern Region. Missoula, Montana. April 1994; updated November 17, 1994.

USDA Forest Service. 1995. Inland Native Fish Strategy Environmental Assessment Decision Notice and Finding of No Significant Impacts.

USDA Forest Service. 1995. Letter to Forest Supervisors in Regions 1, 4, and 6 transmitting a streamlining process for dealing with sensitive species and to clarify conclusions of effects for listed, proposed, and sensitive species. 22 pp.

USDA Forest Service and Montana Cumulative Watershed Effects Cooperative (USFS & MCWEC). 1996. WATSED – Water and Sediment Yields, User Manual and WATSED program version 2.

USDA Forest Service. 1997. Priest Lake Noxious Weed Control Project Environmental Impact Statement. Idaho Panhandle National Forests, Priest Lake Ranger District. Available at the Priest Lake Ranger District office.

USDA Forest Service. 1997. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. 1997a. Biophysical Classification: Habitat Groups and Descriptions (finalized in 1997). Landscape Ecology Peer Group. Northern Region (Region 1). Missoula, Montana.

USDA Forest Service. 1998. Northern Region Overview Detailed Report and Summary. October 1998. Northern Region, Missoula, MT.

USDA Forest Service. 1998. Idaho Panhandle National Forests Monitoring Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1999. Douglas-fir Beetle Final Environmental Impact Statement. Idaho Panhandle and Colville National Forests. Coeur d'Alene, Idaho.

USDA Forest Service. 1999. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. 1999. Roads analysis: informing decisions about managing the national forest transportation system. Misc. Rep. FS-643. Washington, D.C.: U.S. Dept. of Agriculture Forest Service. 222 p.

USDA Forest Service. 1999. Letter to Forest Supervisors in Region 1 updating the Northern Region's sensitive species list. 4 pp.

USDA Forest Service. 2000. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. Draft in progress. Geographic Assessment of the Pend Oreille River Basin. Idaho Panhandle National Forests, Coeur d'Alene, ID.

USDA Forest Service. 2002. Idaho Panhandle National Forests. Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. 2002. The West Gold Project Final Environmental Impact Statement. Sandpoint Ranger District, Idaho Panhandle National Forests. Available at the Sandpoint Ranger District.

USDI, USDA Forest Service and Bureau of Land Management. 1997. Upper Columbia River Basin Draft Environmental Impact Statement (UCRB DEIS). Volume 1., Chapter 2, page 59.

USDI Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. Denver, CO. 119 pp.

USDI Fish and Wildlife Service. 1993. Grizzly Bear Recovery Plan. Missoula, MT. 181 pp.

USDI Fish and Wildlife Service. 2000. Section 7 guidelines - *Silene spaldingii* Spalding's catchfly (proposed Threatened). United States Fish and Wildlife Service Snake River Basin Office. Boise, Idaho.

USDI Fish and Wildlife Service. 2001. Notice of 12-month petition finding for *Botrychium lineare*. 50 CFR part 17. Federal Register. June 6, 2001.

USDI Fish and Wildlife Service. 2002. Update of Forest- and District-wide species list, Endangered, Threatened, Candidate and Species of Concern within the Idaho Panhandle National Forests. SP# 1-9-03-SP-002. October 2, 2002. Spokane, Washington. 2 pp.

USDI Fish and Wildlife Service. 2003. Update of Forest- and District-wide species list, Endangered, Threatened, Candidate and Species of Concern within the Idaho Panhandle National Forests. SP# 1-9-03-SP-365. June 4, 2003. Spokane, Washington.

Volsen David P. 1994. Habitat use of a Grizzly Bear population in the Selkirks Mountains of Northern Idaho and southern British Columbia. M.S. Thesis. Univeristy of Idaho. 106 pp.

Wagner, W.H. and F.S. Wagner. 1994. Another widely disjunct, rare and local North American moonwort (Ophioglossaceae: *Botrychium* subg. *Botrychium*). American Fern Journal 84(1):5-10.

Ward, Darold E., 1992. Biomass Consumption and Emissions Production. Smoke Management Training, presented at Northern Rockies Training Center, Missoula, MT.

Warren, N., tech. editor. 1990. Old growth habitats and associated wildlife species in the northern Rocky Mountains. Northern Region Report R1-90-42: USDA Forest Service, Missoula, MT. 47 pp.

Washington State Department of Natural Resources, 1998. Washington State Smoke Management Plan 1993 (Revised 1998)

Whitson, Tom D., Larry C. Burrill, Steven A. Dewey et al. 1991. Weeds of the West. Western Society of Weed Science. Bozeman, Montana.

Williams, T.Y. 1990. *Lycopodium obscurum* [= *L. dendroideum*], In: Fisher, William C., compiler. The fire effects information system database at http://www.fs.fed.us/database/feis. USDA. Forest Service, Intermountain Research Station. Missoula, Montana.

Zager, P. E. 1981. Northern Selkirk Mountains Grizzly Bear Habitat Survey. Unpublished report 75p.

Zack, Arthur, and P. Morgan. 1994. Fire History on the Idaho Panhandle National Forest, Draft.

Appendix F - List of Preparers

Chips Ahoy Project Interdisciplinary Team

Name	Title	Team Assignment	Education	Office
Chad Baconrind	Fisheries Biologist	Fisheries	B.S. Fish and Wildlife Biology	Sandpoint Ranger District
Debbie Butler	Resource Forester	Recreation Scenery, Special Uses	B.S. Forestry; Graduate Studies Recreation	Priest Lake Ranger District
David Cobb	Forester	Vegetation	B.S. Forestry Management; M.S. Forestry Management;	Priest Lake Ranger District
Jill Cobb	Hydrologist	Water Resources Soils	B.A. Geography & Ecosystems Analysis, M.S. Watershed Mgmt.	Priest Lake Ranger District
David DelSordo	Forester Team Leader	Document Review Document Editor, DEIS Soils	B.S. Forestry, M.S. Forestry	Priest Lake Ranger District
Anna E. Hammet	Botanist	TES and Rare Plants Noxious Weeds	B.A. Biology (Botany)	Sandpoint Ranger District
Tim Layser	Wildlife Biologist	TES and Other Wildlife	B.S. Wildlife Biology, M.S. Environmental Science-Nat Resource Management	Priest Lake Ranger District
Maridel Merritt	Writer-Editor	Writer/Editor, DEIS	B.S. Agriculture	Bonners Ferry Ranger District
Tom Sandberg	Archaeologist	Heritage and Cultural Resources	B.A. Archaeology/ Anthropology	Sandpoint Ranger District
Judy York	Writer-Editor	Writer/Editor, DEIS	B.S. Wildlife, M.S. Nat. Resource Communication	Sandpoint Ranger District

Support Team Members – Individuals that provided technical or other support.

Name	Title – Team Assignment	Area of Support	Office
Teresa Asleson	Paraprofessional	Heritage Resource Inventory	Priest Lake Ranger District
Camilla Cary	Editorial Assistant	Content Analysis, Public Involvement	Priest Lake Ranger District
Karl Dekome	NEPA Coordinator	NEPA Consultation and Document Review	Supervisor's Office, Idaho Panhandle National Forests
Dan Jackson	Engineering	Road Design and Costs	Priest Lake Ranger District
Linda Bernhardt	Biological Technician	GIS Mapping for Wildlife Analysis	Sandpoint Ranger District
Lu LeMieux	Trails Coordinator	Recreation and Trails	Priest Lake Ranger District
Deb Scribner	Information Management Specialist, Database Coordinator	GIS Mapping and Database Information	Sandpoint Ranger District
Gary Weber	Asst Fuel Management Officer	Preliminary Fire/fuels Analysis	Priest Lake Ranger District

Appendix G - List of Those Receiving the DEIS

The following agencies, organizations and individuals were either mailed a copy of this Draft EIS in paper or compact disc format, or received only the Summary as requested, or planned to view the document on the Idaho Panhandle National Forests internet website.

Organization	Last Name	First Name
ALLIANCE FOR THE WILD ROCKIES	WOOD	MIKE
	SEDLER	LIZ
AMERICAN WILDLAND	BAILEY	GUY
BONNER COUNTY ROAD COMMISSIONERS	ORR	BRIAN
DEFENDERS OF WILDLIFE	ROBIN	ALEXANDER
THE ECOLOGY CENTER	JUEL	JEFF
EMBASSY OF HEAVEN CHURCH		
IDAHO CONSERVATION LEAGUE	OPPENHEIMER	JONATHAN
	ROBISON	JOHN
IDAHO DEPT OF ENVIRONMENTAL QUALITY	BERGQUIST	JUNE
	ROTHROCK	GLEN
IDAHO FISH AND GAME	CORSI	CHIP
IDAHO DEPT OF PARKS AND REC	MUNSON	LEWIS
	COLLIGNON	RICK
	COOK	JEFF
IDAHO PLANT SOCIETY	O'REILLY	MOLLY
IDAHO SPORTING CONGRESS	MITCHELL	RON
IDAHO STATE HISTORICAL SOCIETY	DAVIS	MARY ANNE
KALISPEL TRIBAL OFFICE	NENEMA	GLEN
KETTLE RANGE CONSERVATION GROUP	RENWYCK	MARLENE
KOOTENAI ENVIRONMENTAL ALLIANCE	MIHELICH	MIKE
KOOTENAI TRIBE OF IDAHO	SOULTS	SCOTT
	AITKEN	GARY
KSPT/KPND RADIO STATIONS	BROWN	MIKE
THE LANDS COUNCIL	ATTEMANN	REIN
PANHANDLE HEALTH DISTRICT		
PEND OREILLE CONSERVATION SERVICE	COMINS	DON
PEND OREILLE COUNTY COMMISSIONERS		
PEND OREILLE COUNTY NOXIOUS WEEDS	SORBY	SHARON
SELKIRK CONSERVATION ALLIANCE	SPRENGEL	MARK
SELKIRK PRIEST BASIN ASSOCIATION	BAILEY	GUY
US ENVIRONMENTAL PROTECTION AGENCY	EIS FILING SECTION	
US ENVIRONMENTAL PROTECTION AGENCY	EIS REVIEW COORDINATOR	
US ENVIRONMENTAL PROTECTION AGENCY	POTTS	STEVE
US ENVIRONMENTAL PROTECTION AGENCY	WARDELL	JOHN
USDA FOREST SERVICE	ECOSYSTEM MANAGEMENT COORDINATOR	
USDA NATL AGRIGULTURAL LIBRARY		
USDA OFFICE OF CIVIL RIGHTS		
USDI OFFICE OF ENVIRONMENTAL AFFAIRS		
USDI FISH AND WILDLIFE SERVICE	MARTIN	SUSAN
UNITED STATES SENATOR	CRAPO	MICHAEL
WA DEPT OF FISH AND WILDLIFE	WHALEN	JOHN
WA DEPT OF NATURAL RESOURCES	OBERMAYER	WALT

Individuals

Last Name	First Name
Cobb	Fields
Benner	Marion
Booth	Steve
Flesher	Doloris
Frachiseur	Glen
Fulp	Ralph
Goheen	David
Jayo	Marie
Jepson	Delbert
Lowrey	Mark
Phelps	Randy
Rosenberg	Barry
Rutherford	Hayes
Schneider	James
Shelton	Dale
Shepard	Duane
Soumas	Rob
Spies	C. G.
Stockton	John
Sudnikovich	Mike
Tilden	Carole
Towner	Fred
Turnball	Roy
Ulrich	Roberta
Van Derheijden	Hubert
Van Derheijden	Raymond

Appendix H – Graphics

This appendix contains the maps and a few of the figures referenced throughout the EIS document. They have been printed in color to aid the reader in understanding the proposed action and details of the various alternatives.

Figures H-1 through H-8 relate to the Vegetation discussion in Chapter II of the EIS.

Figures H-9 and H-10 relate to the Vegetation discussion in Chapter III of the EIS.

Figures H-11 through H-14 relate to the Wildlife discussion in Chapter III of the EIS.

Figures H-15 through H-17 related to the Aquatic discussion in Chapter III of the EIS.

Figure H-1
Alternative B

This map shows the vegetation treatments, road maintenance, construction, and temporary construction in Alternative B.

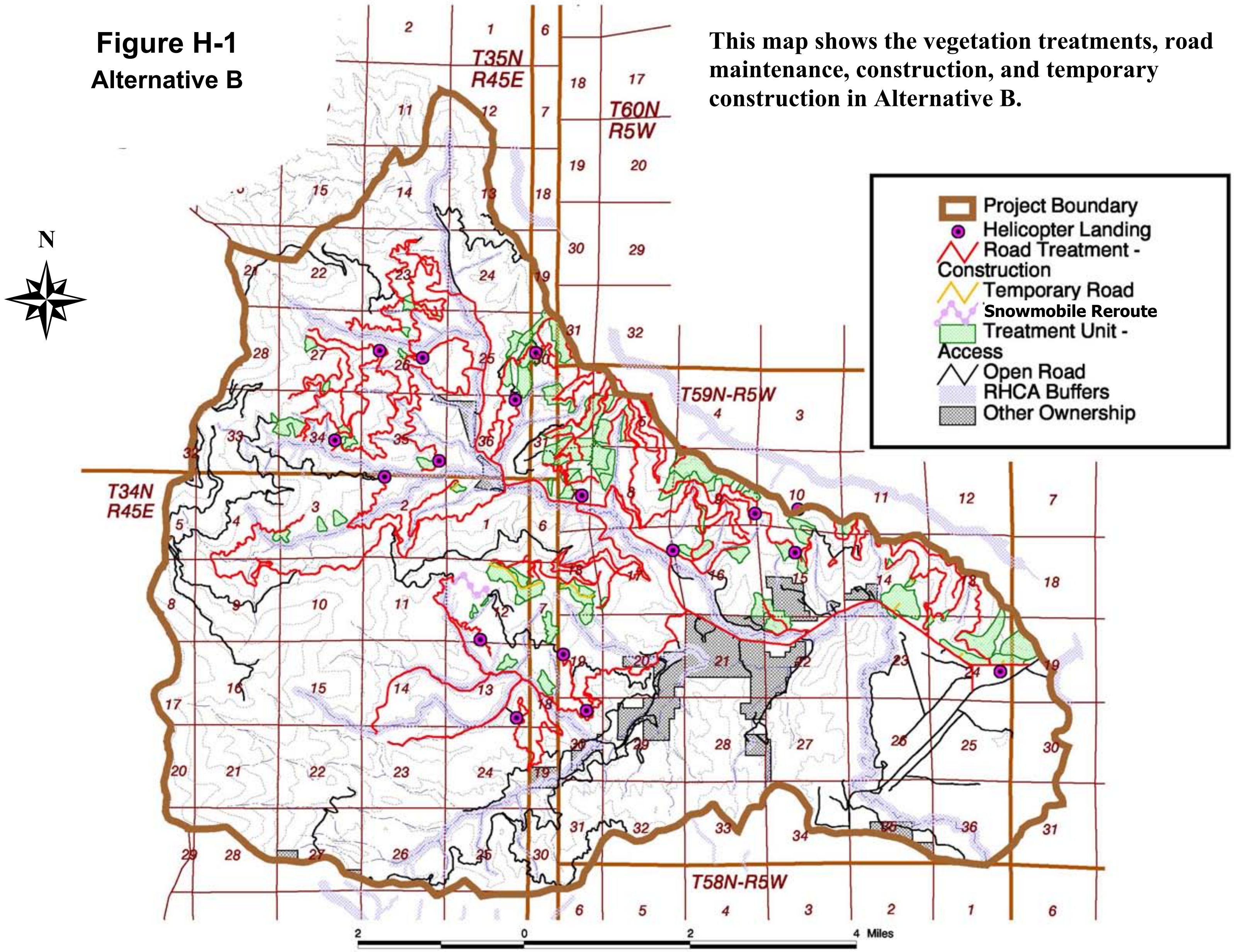


Figure H-2
Alternative C

This map shows the vegetation treatments and road maintenance in Alternative C.

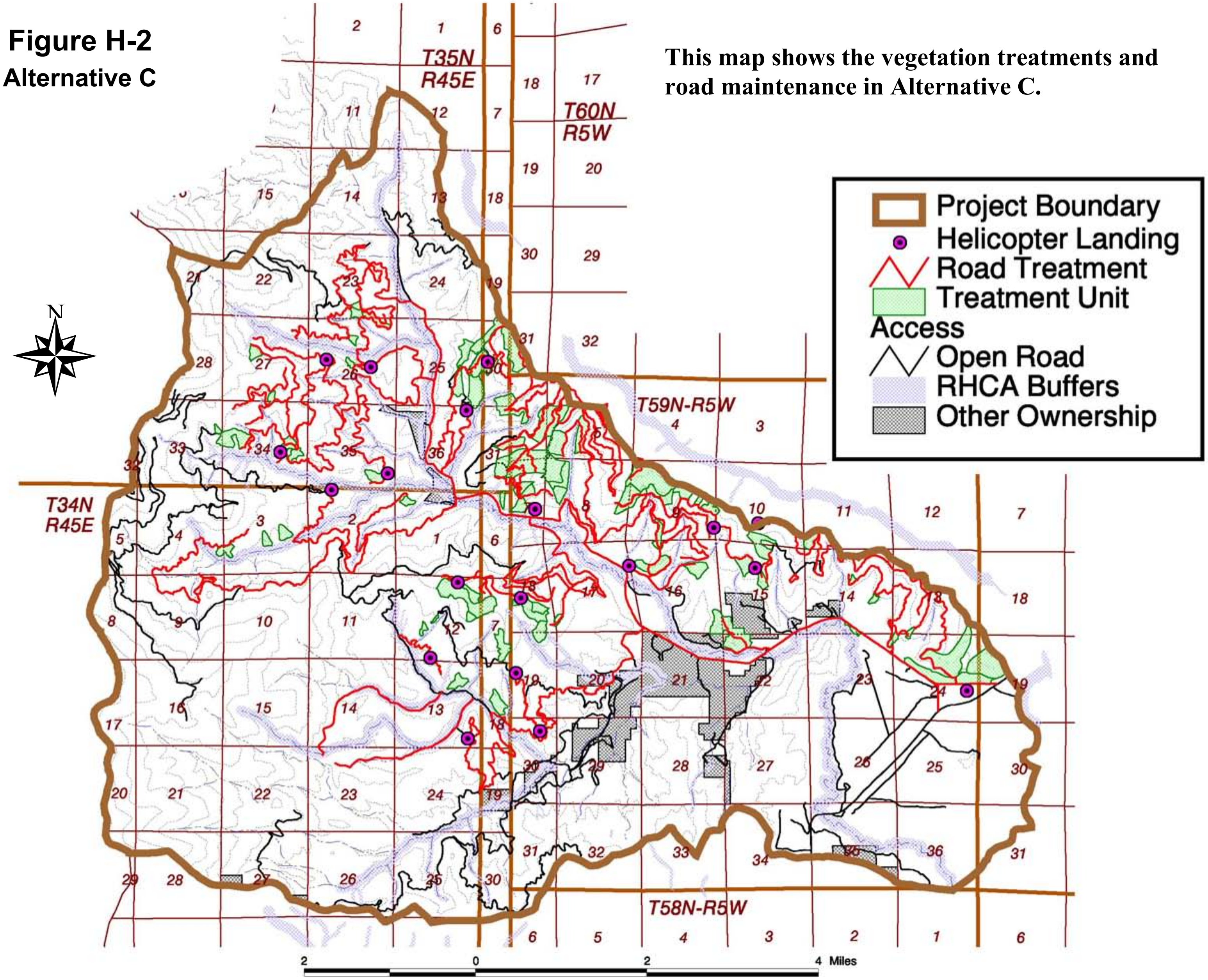


Figure H-3
Alternative D

This map shows the vegetation treatments, road maintenance, construction, and temporary construction in Alternative D.

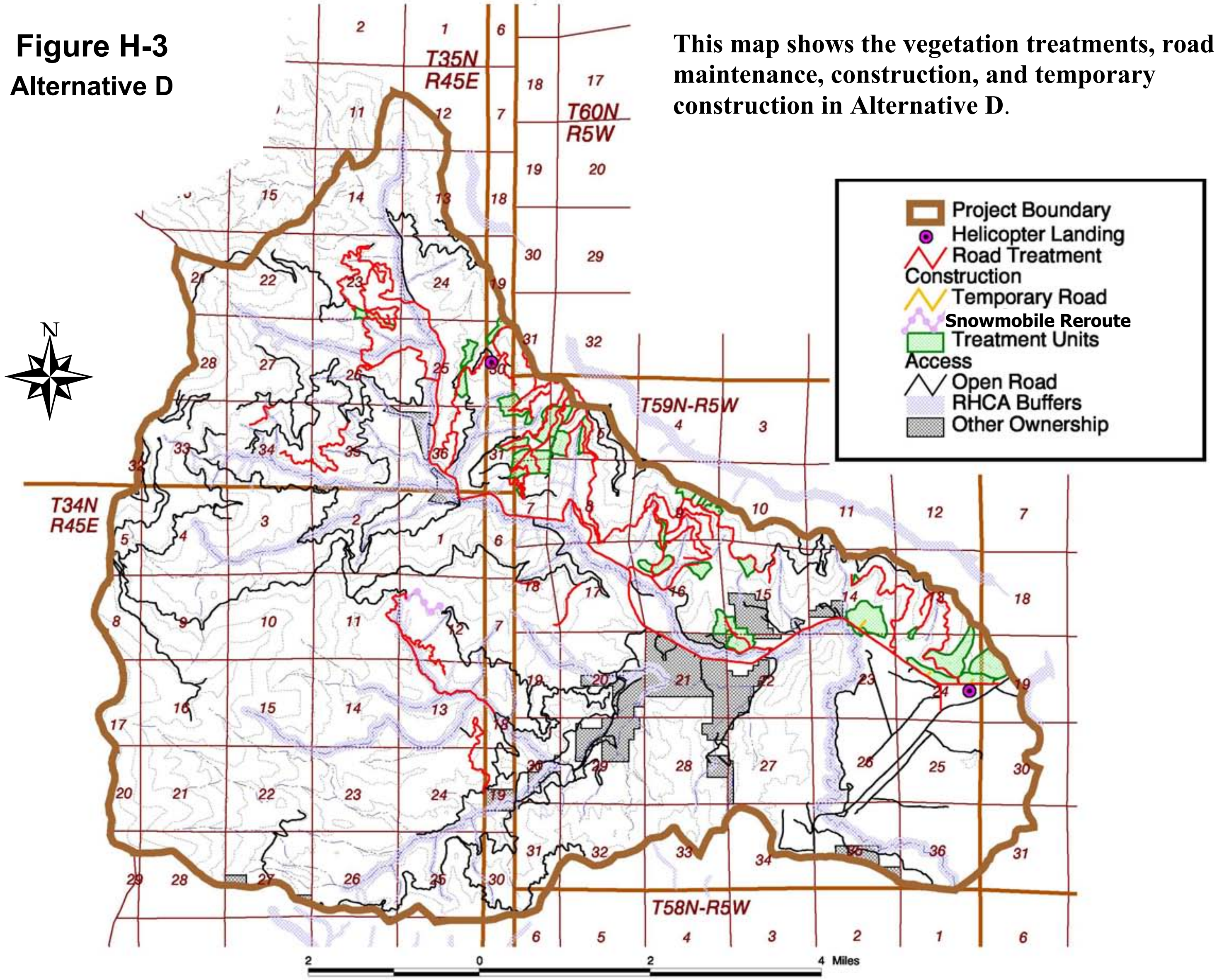


Figure H-4
Alternative B Road Management

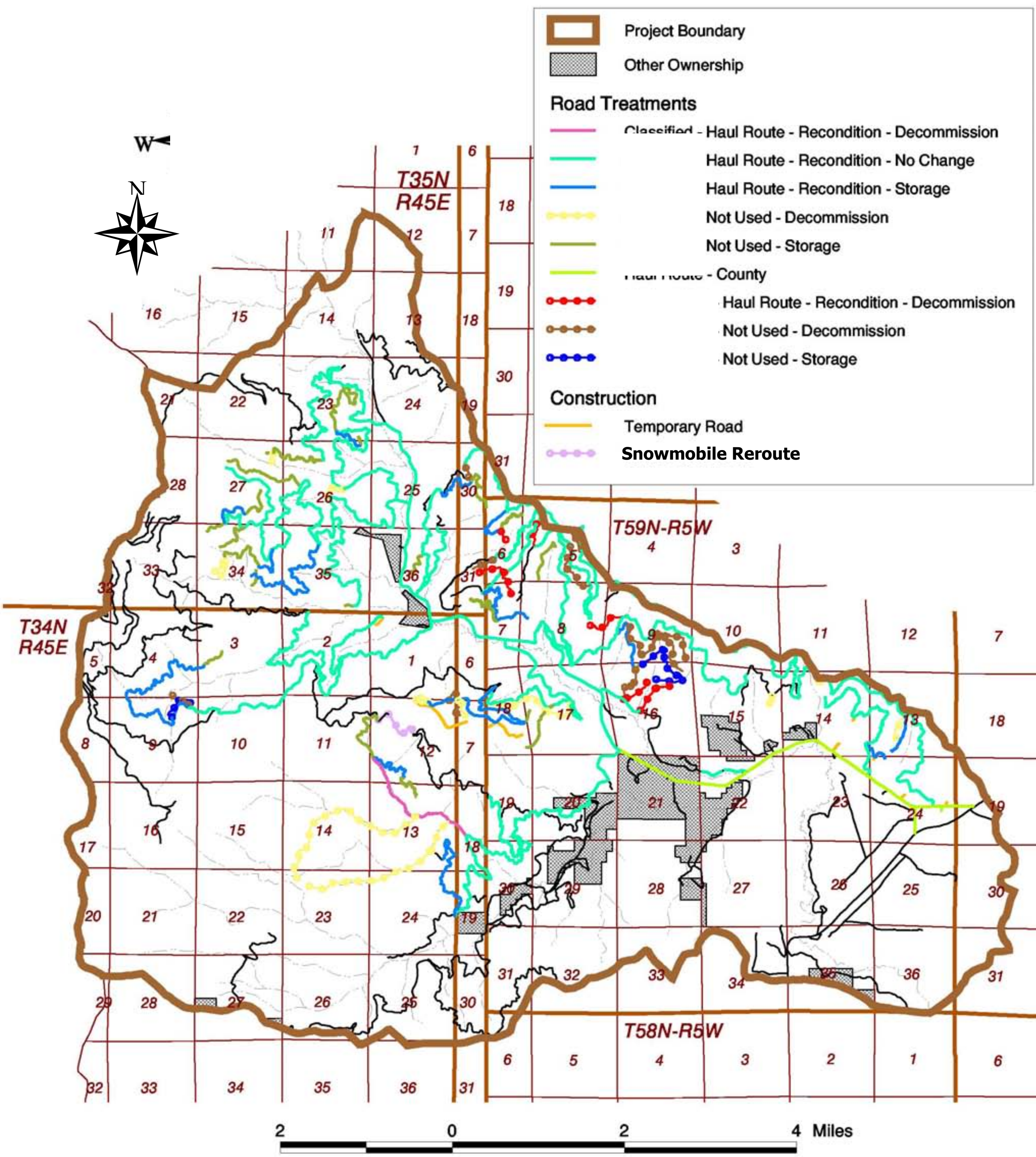


Figure H-5
Alternative C Road Management

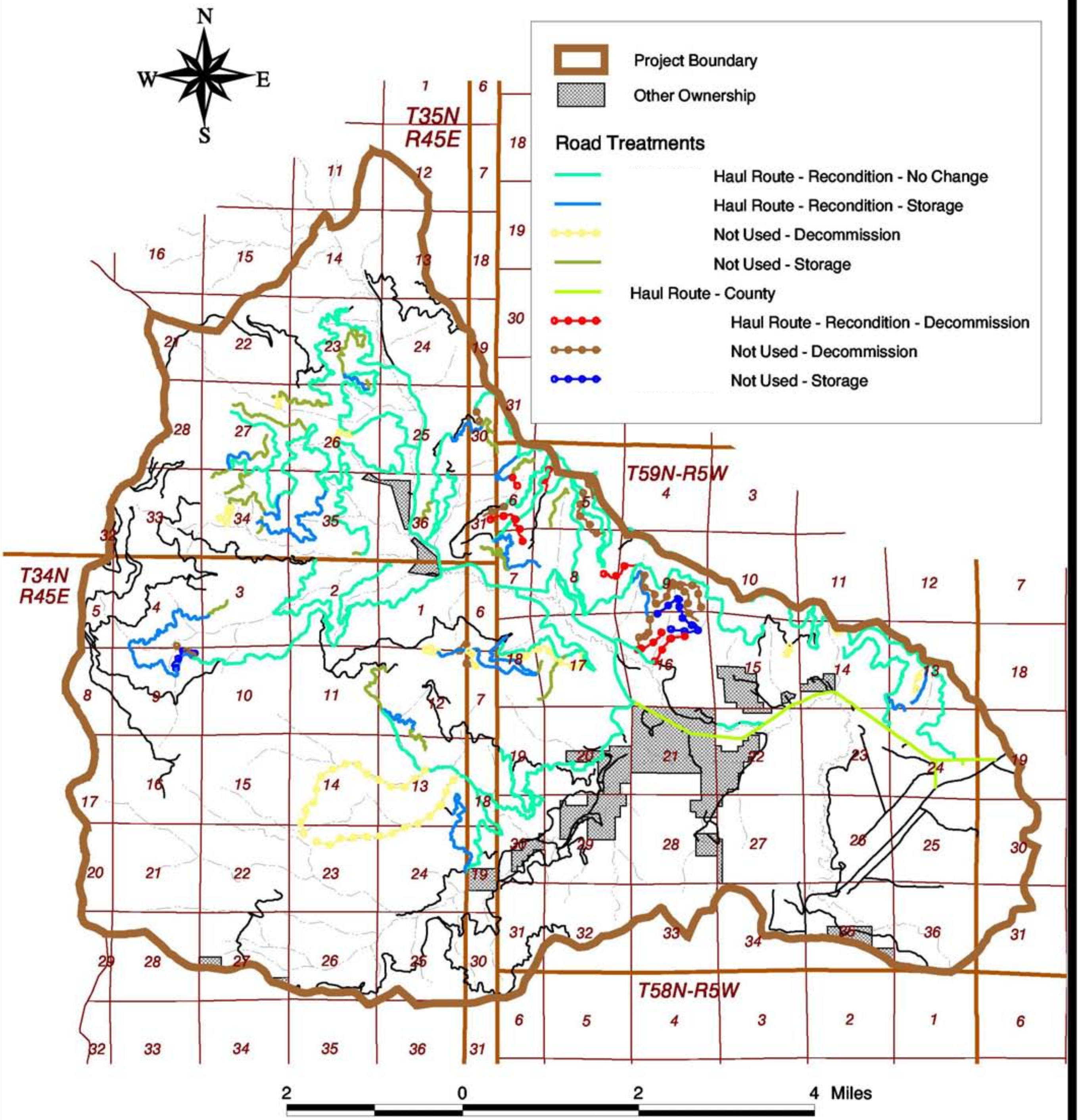


Figure H-6
Alternative D Road Management

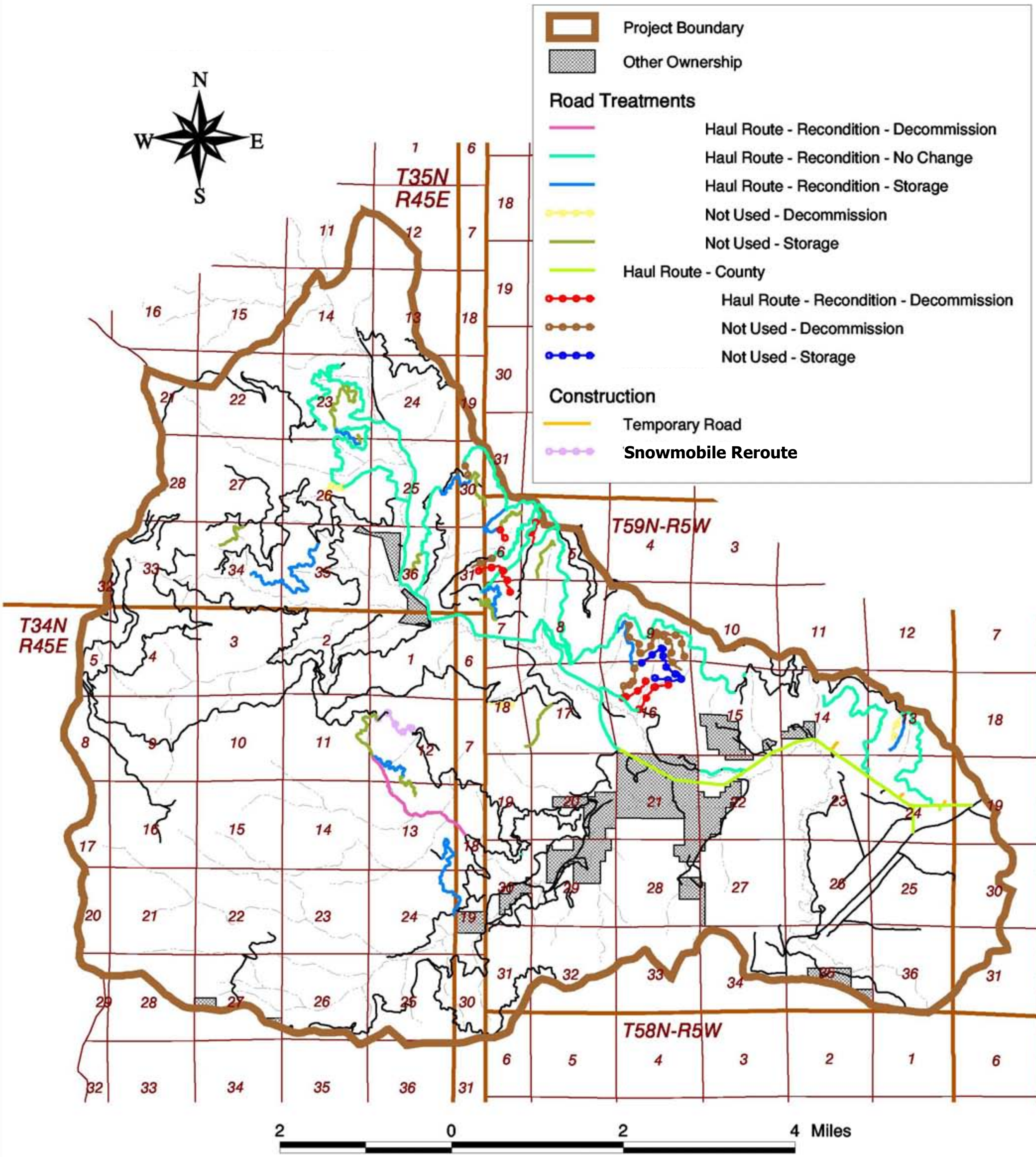


Figure H-7

West Half Treatment Units

This map displays all treatment areas proposed within the western half of the project area. Refer to Appendix C Vegetation Information, Tables C-1 thru C-3, for details of the units included in each alternative.

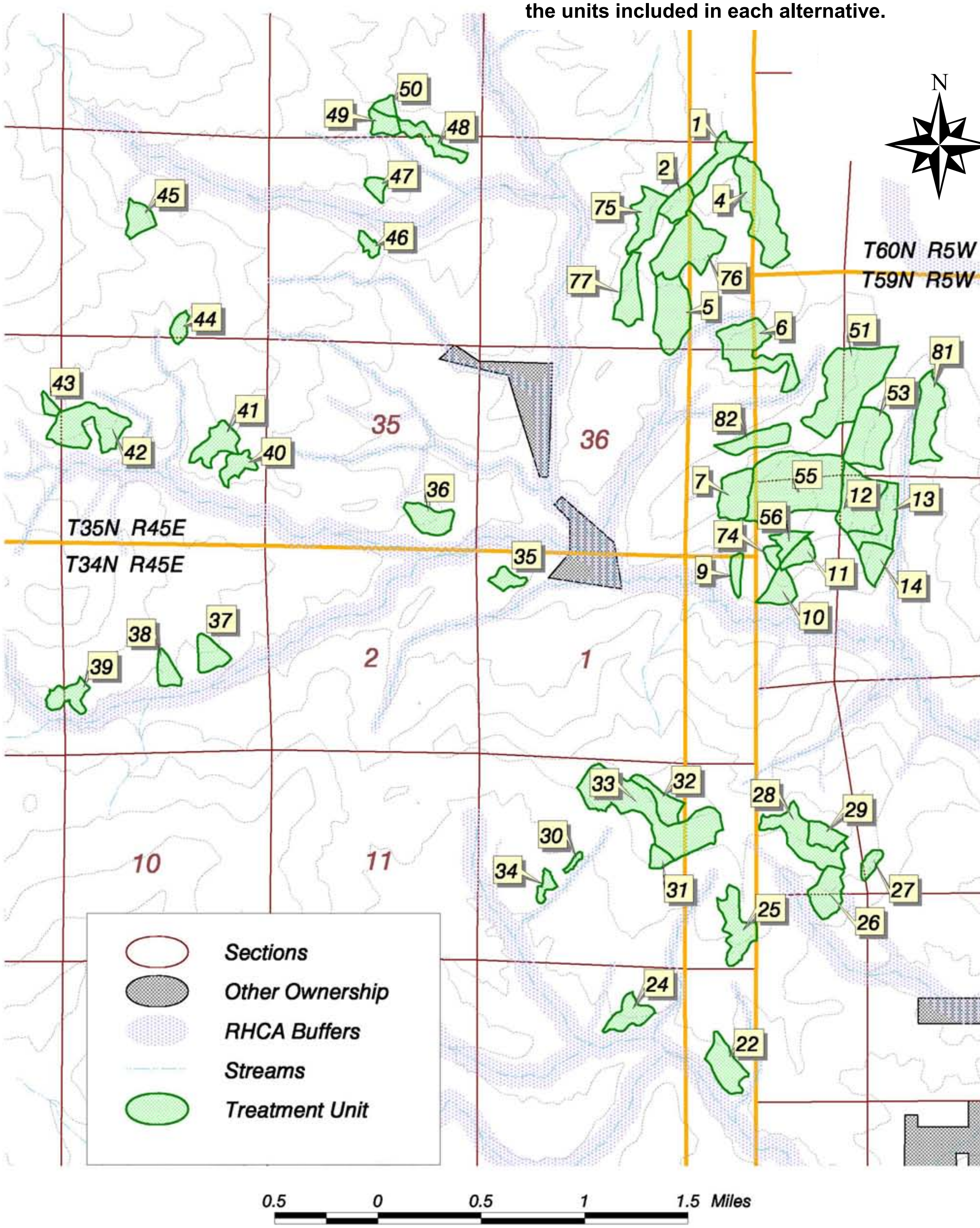
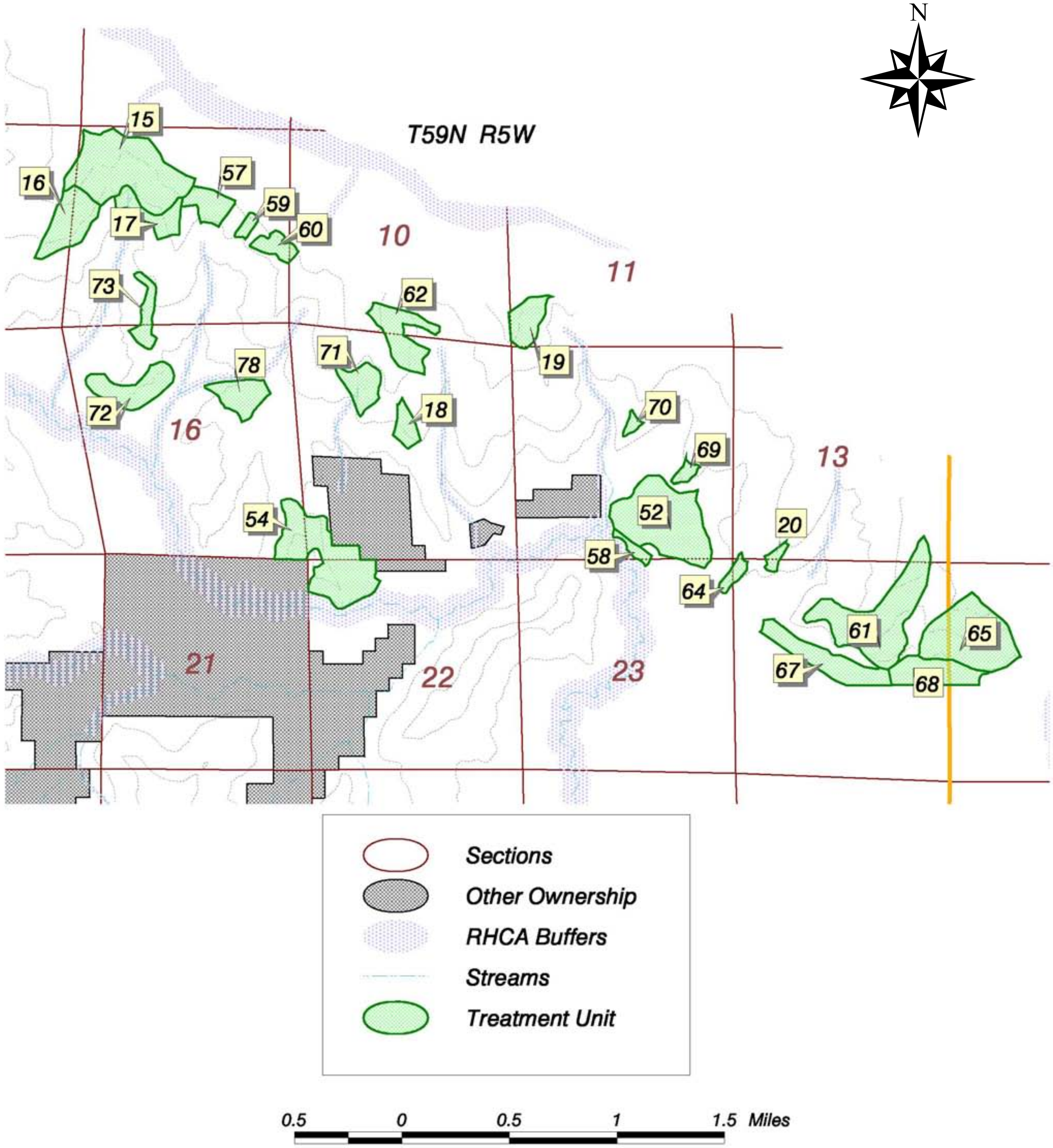


Figure H-8
East Half Treatment Units

This map displays all treatment areas proposed within the eastern half of the project area. Refer to Appendix C Vegetation Information, Tables C-1 thru C-3, for details of the units included in each alternative.



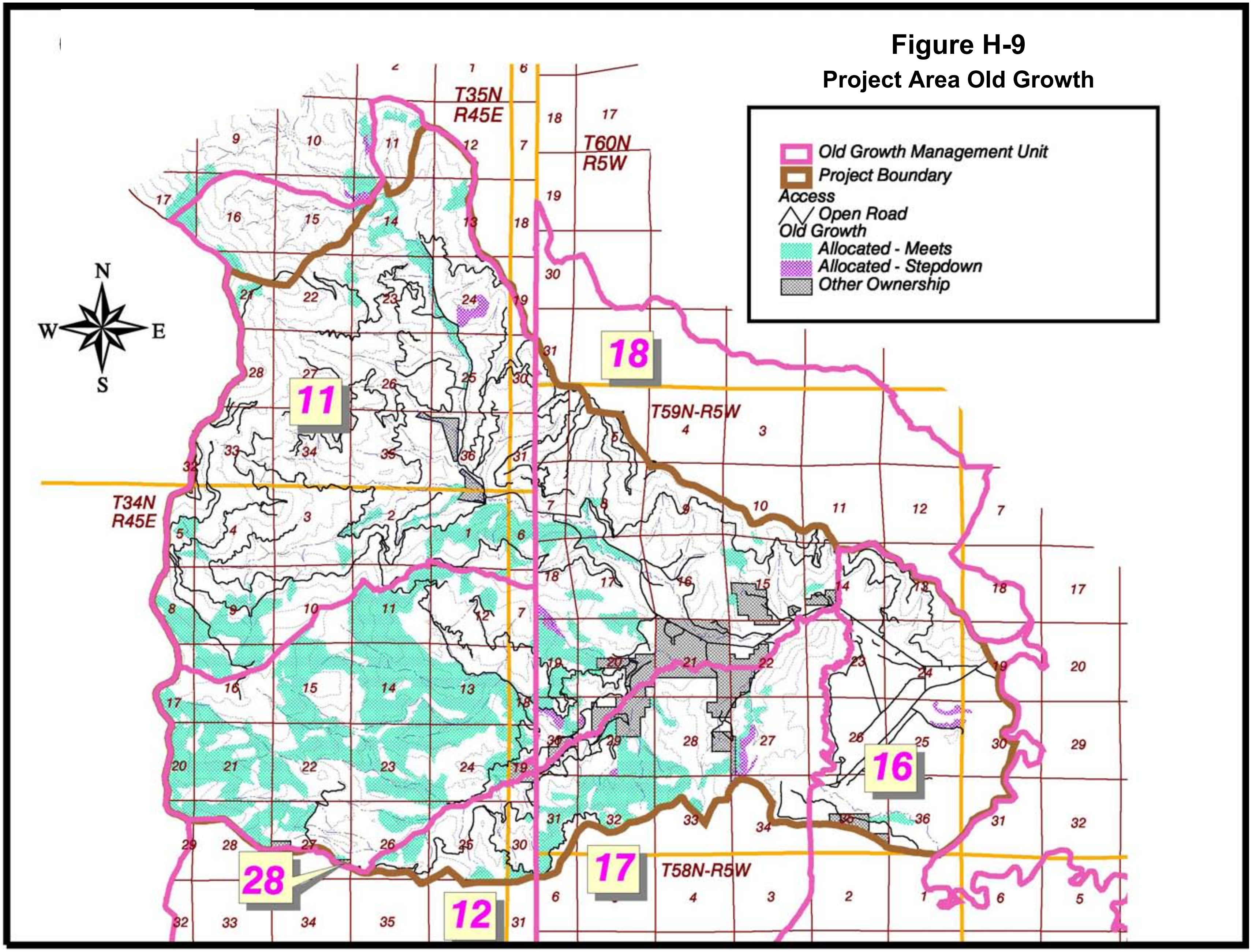


Figure H-9
Project Area Old Growth
Old Growth Management Unit
Project Boundary
Access
Open Road
Old Growth
Allocated - Meets
Allocated - Stepdown
Other Ownership
N
S
W
E
T35N
R45E
T60N
R5W
T34N
R45E
T59N-R5W
T58N-R5W
11
18
16
17
28
12

Figure H-10

Chips Ahoy Project Area Fire History

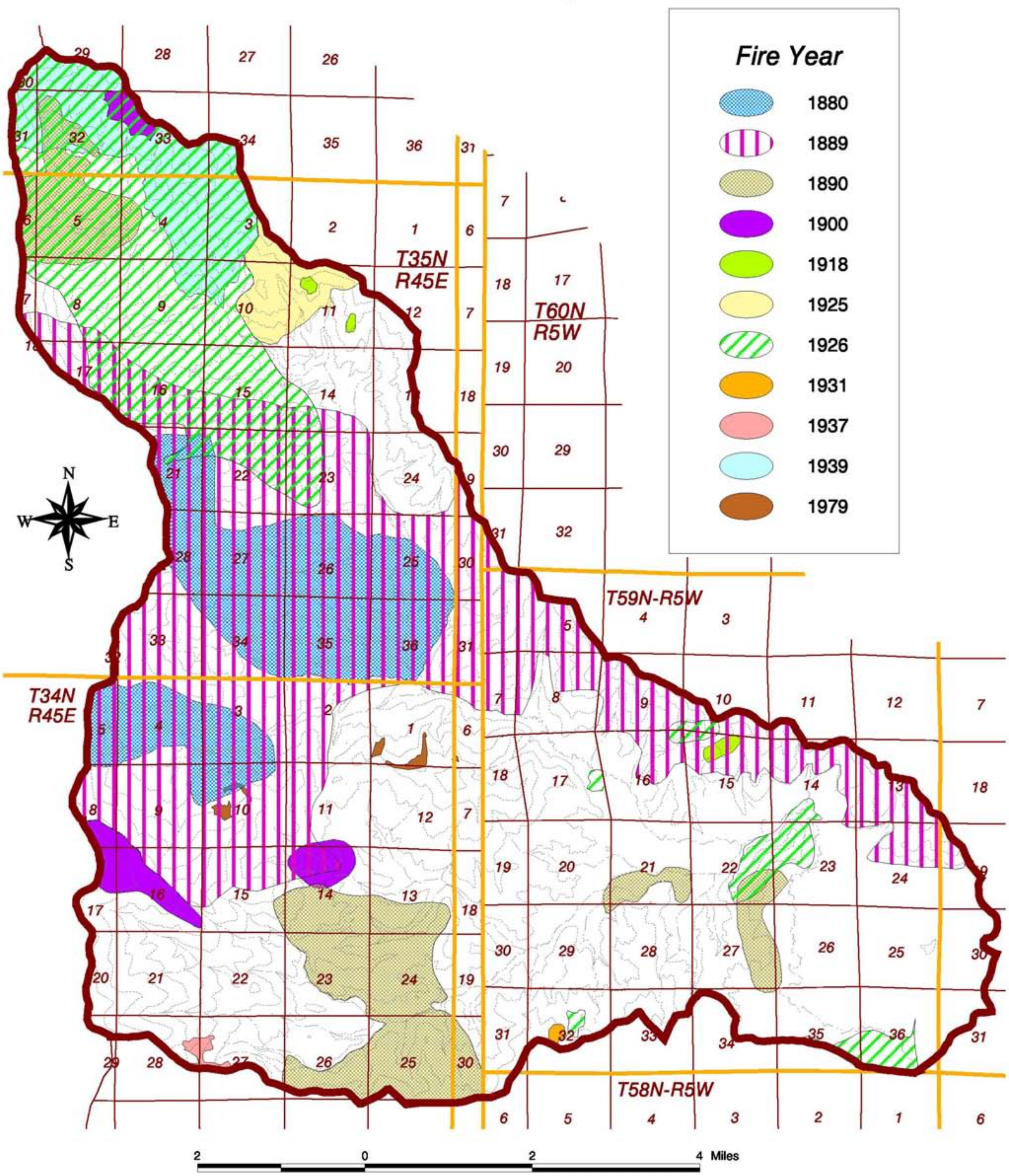


Figure H-11

Snowmobile Routes and Play Areas

Lynx Analysis Units and Cumulative Effects Area

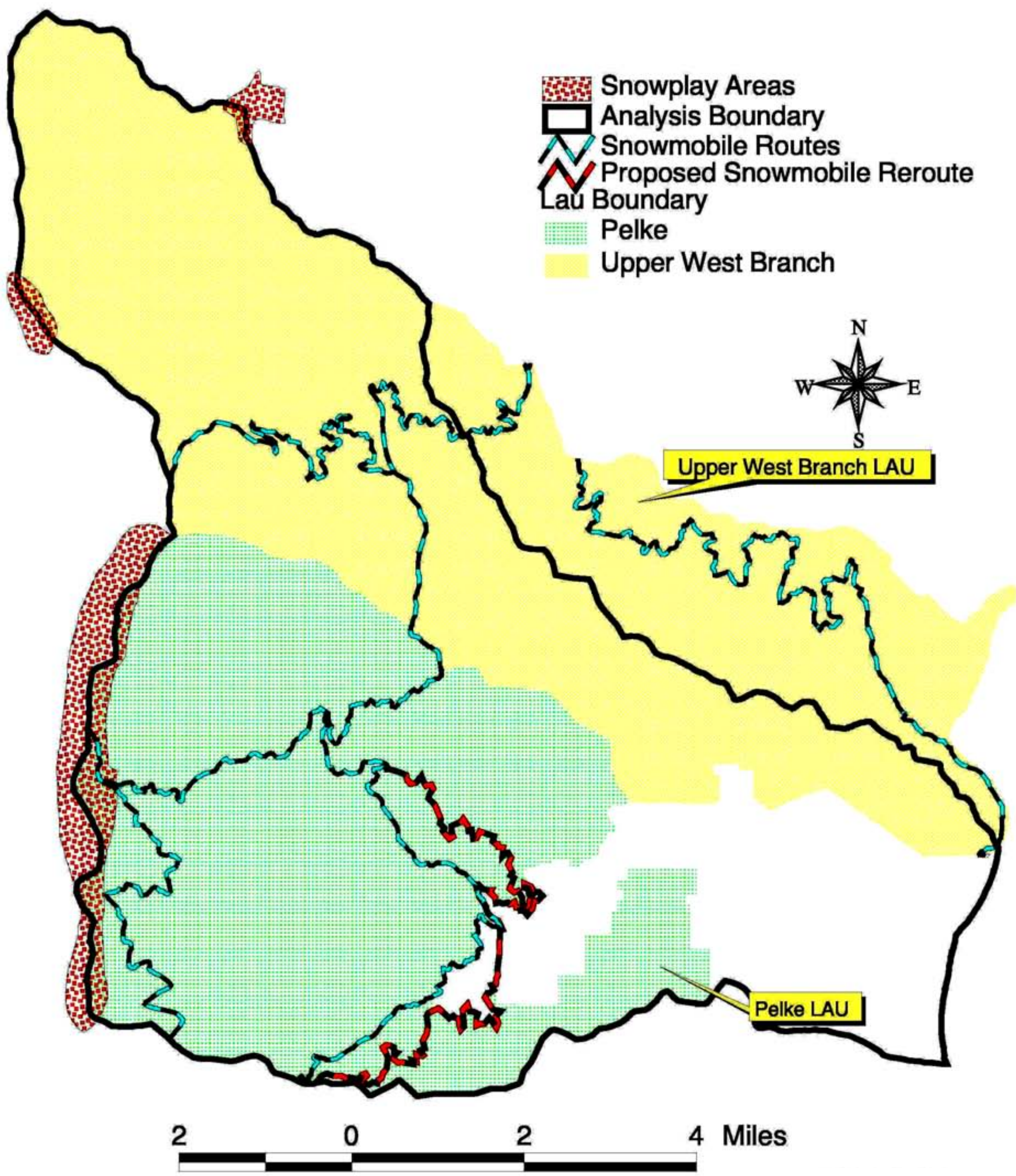


Figure H-11 This map shows the current groomed snowmobile routes (blue/black) within the lynx cumulative effects analysis area, and the proposed relocation (red/black) of the southern route. Pelke LAU is displayed in light green; Upper West Branch LAU in light yellow.

Figure H-12

Lynx Cumulative Effects Analysis Area
Upper West Branch LAU and Pelke LAU

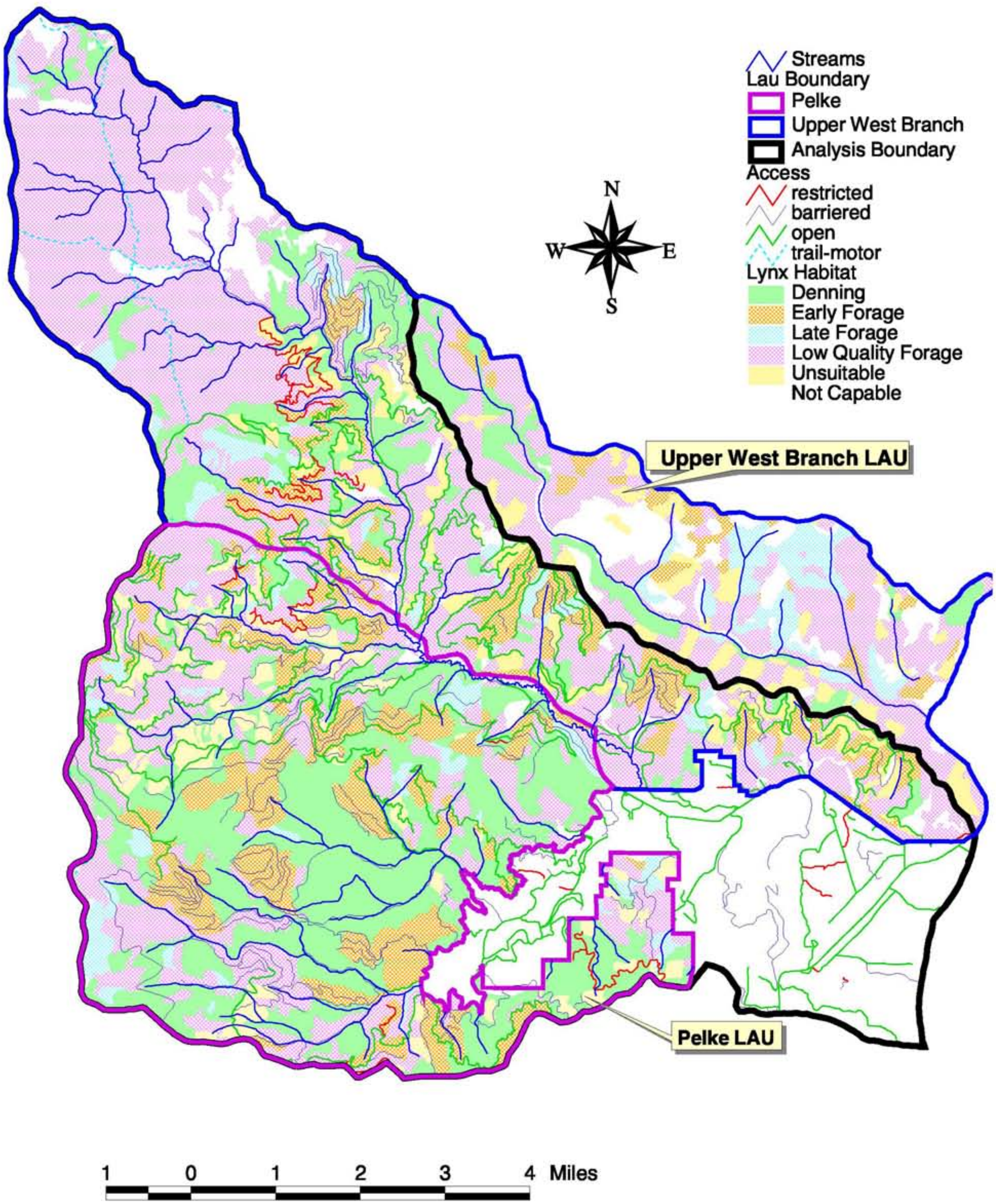
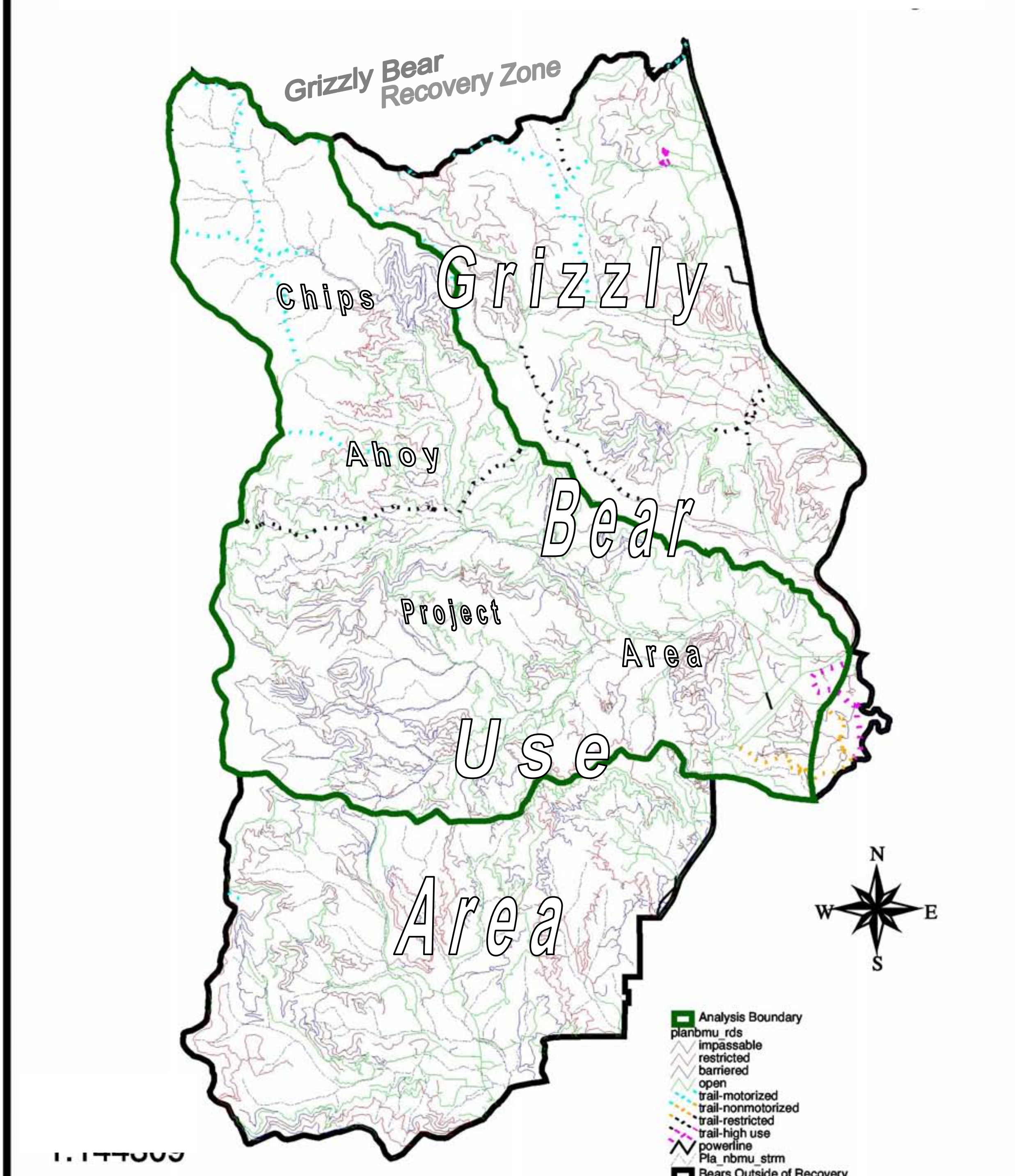


Figure H-13.

Grizzly Bear Cumulative Effects Analysis Area and Area Used by Bears Outside Recovery Zones



This map shows the area known to be used by grizzly bears outside designated Recovery Areas. The Chips Ahoy project area, in the center of the grizzly bear use area, encompasses about 43 percent of the bear use / cumulative effects analysis area.

Figure H-14

Flammulated Owl Cumulative Effects Area and Habitat Conditions

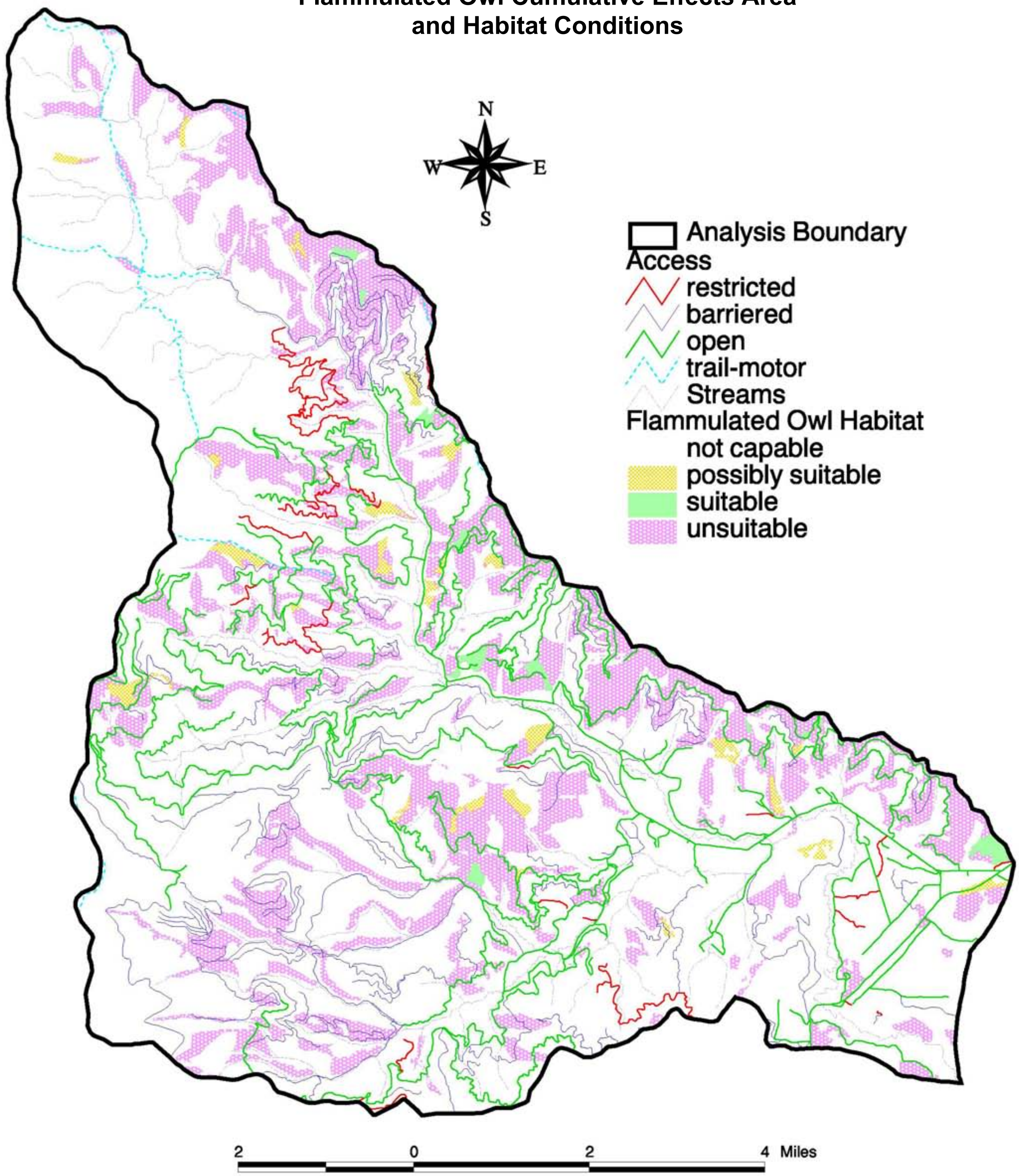
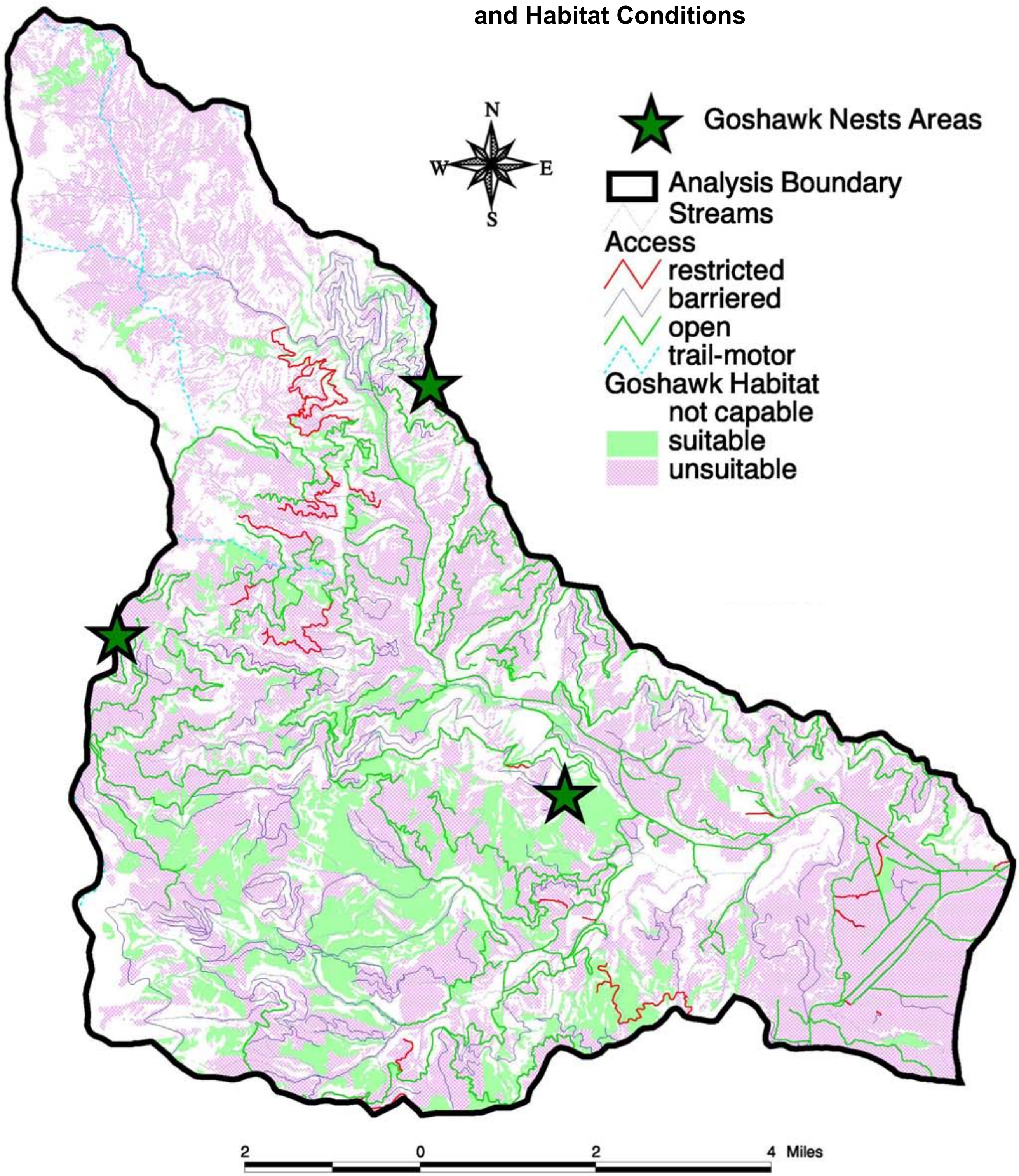


Figure H-15
Northern Goshawk Cumulative Effects Area and Habitat Conditions



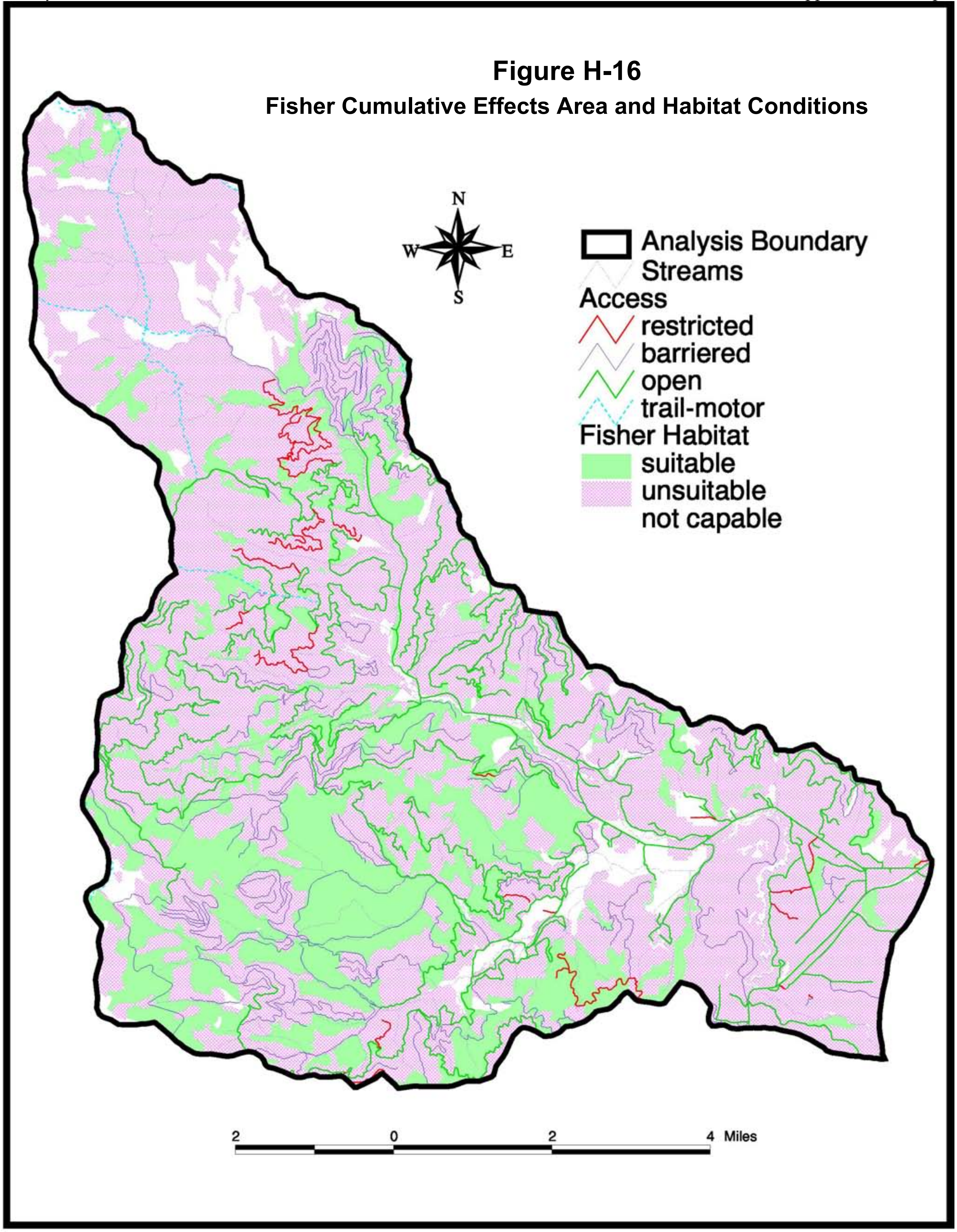


Figure H-16
Fisher Cumulative Effects Area and Habitat Conditions
N
W
E
S
Analysis Boundary
Streams
Access
restricted
barriered
open
trail-motor
Fisher Habitat
suitable
unsuitable
not capable
2
0
2
4 Miles

Figure H-17
Upper West Branch Drainages

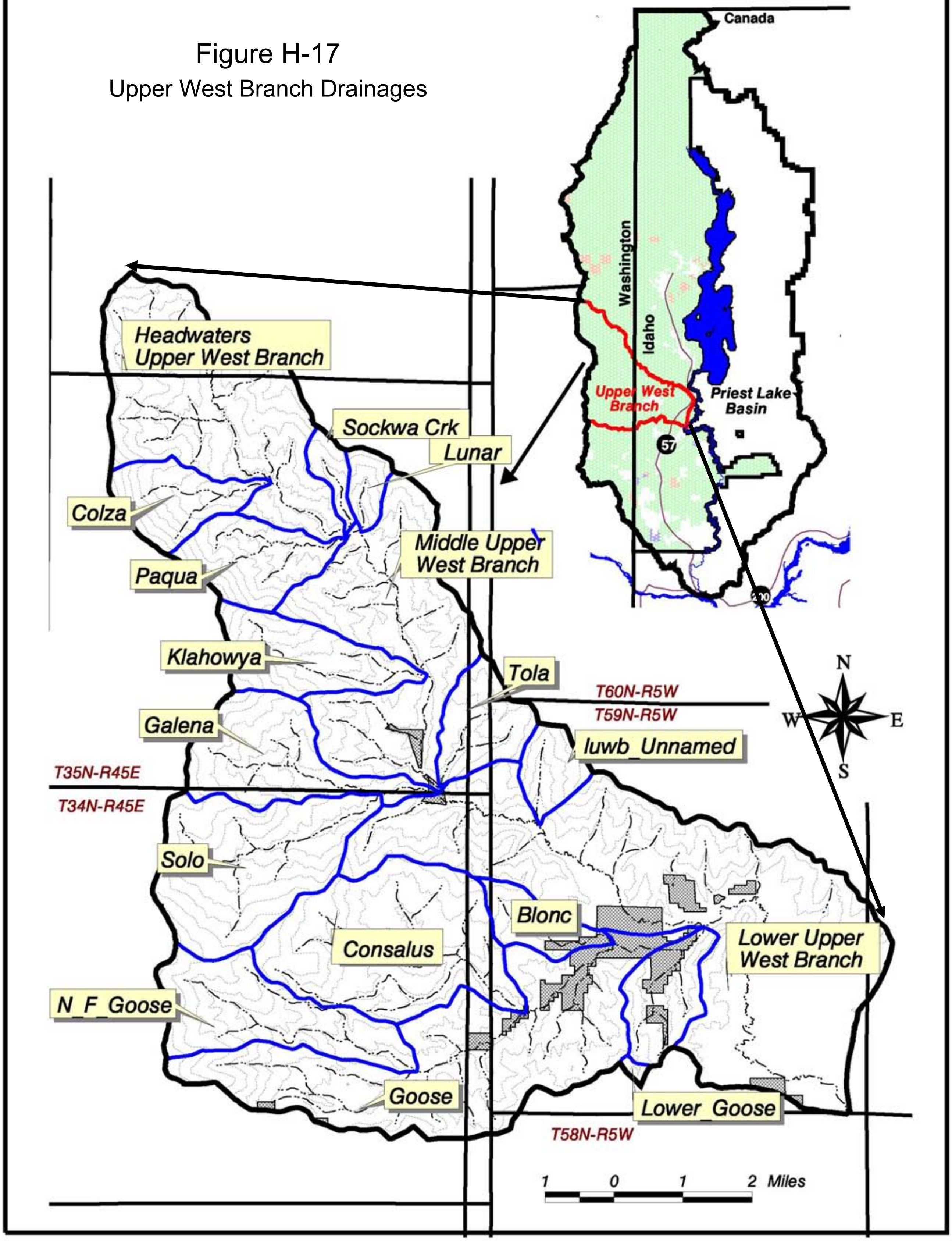


Figure H-18

Upper West Branch Watershed

Mass Failure Potential

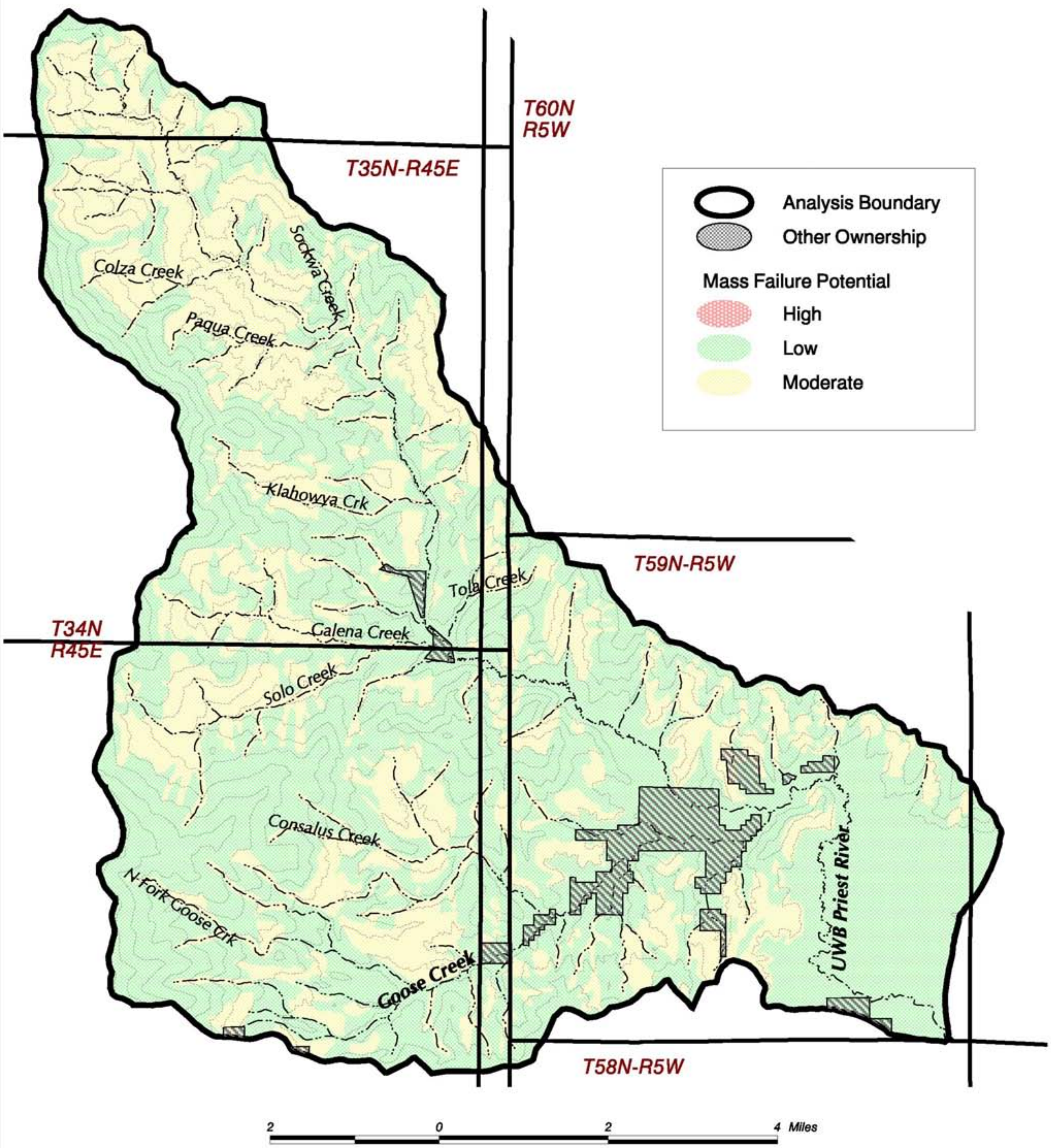


Figure H-19
Upper West Branch Watershed
Sediment Delivery Potential

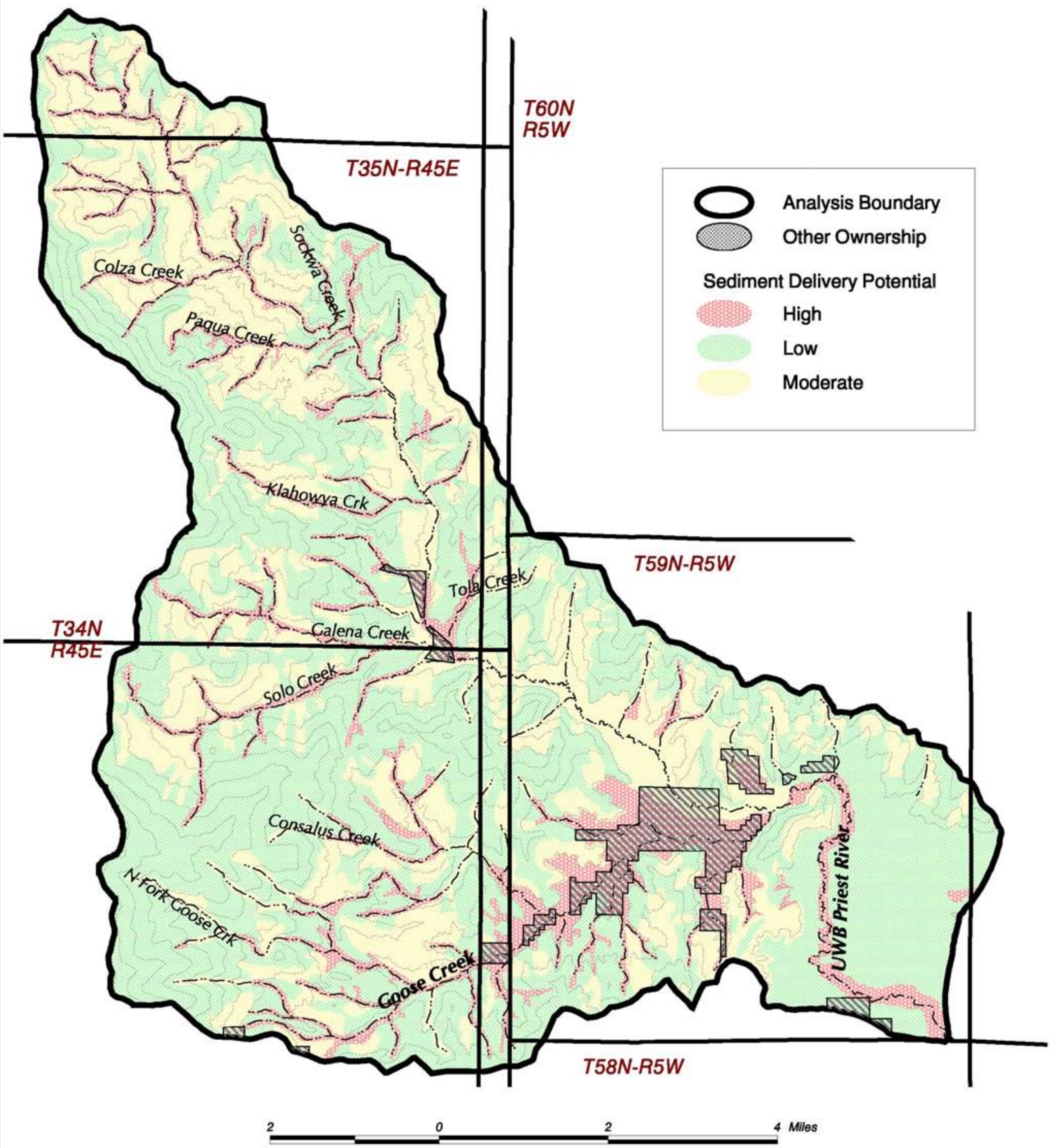


Figure H- 20: Estimated acres logged by drainage by decade from 1920 until 2000.

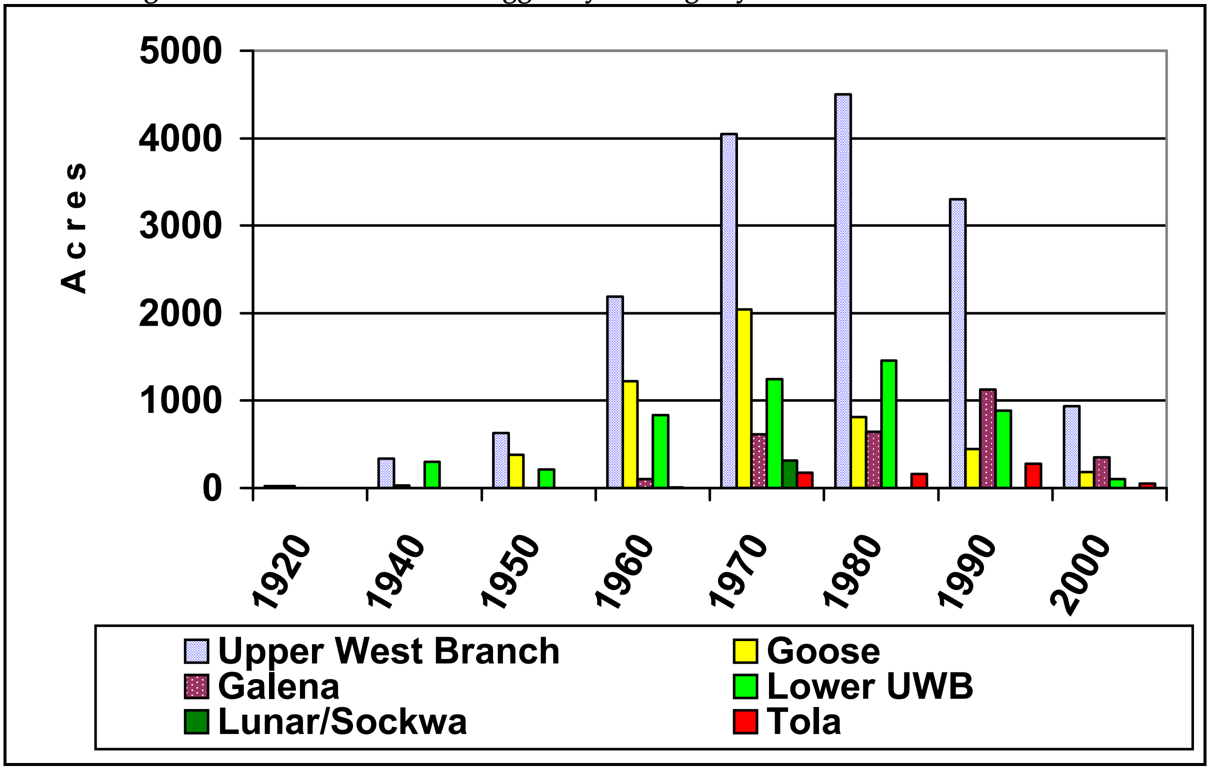


Figure H-21. The estimated percent of regeneration harvest within the Upper West Branch by sub drainage since 1970.