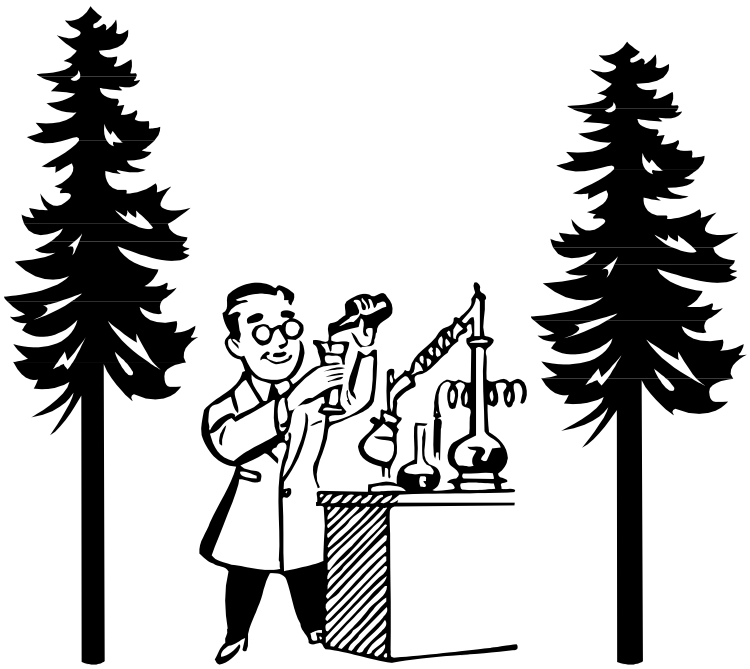
United States Department of Agriculture
Forest Service

Canyon Creek Research Project

Environmental Assessment



Priest Lake Ranger District
Idaho Panhandle National Forests
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Chapter 1: Purpose and Need for Action

1.1 Introduction

Research Foresters employed by the Rocky Mountain Research Station, USDA Forest Service, are proposing to conduct a forestry research study in the Priest River Experimental Forest (PREF). This study would help to develop forest restoration strategies that could be used to sustain or restore mature western white pine forests throughout the Inland Northwest. The research project would evaluate the extent to which these strategies influence the structure, composition and pattern of forest vegetation. In addition to studying the vegetation, the research project would involve investigating how the restoration strategies influence nutrient dynamics, water quality, and forest insect and diseases within these western white pine ecosystems.

The Researchers that proposed the study teamed up with staff and resource specialists on the Idaho Panhandle National Forests (IPNF) to develop an integrated proposal for the project area. The proposed project, called the Canyon Creek Research Project, involves conducting the research as well as implementing some other road related improvement projects that were included to address water quality and fish habitat issues. This Environmental Assessment (EA) was developed to disclose the effects that the proposed project and alternatives would have upon the environment.

The proposed research project is located approximately 15 miles north of the community of Priest River, Idaho, within the Priest River Experimental Forest. This experimental forest is approximately 6,400 acres in size and occurs within the Idaho Panhandle National Forests. The major drainage in the project area is Canyon Creek, which flows into the Middle Fork of the East River. The legal location of the project area includes portions of sections 23 and 24, T58N, R4W; and a portion of section 19, T58N, R3W, B.M. See Figure 1-1 for the general location of the PREF and the proposed project, and Figure 1-2 for a more detailed map of the proposed project area.

This chapter identifies the proposed action, the purpose and need for action, a summary of the applicable management direction for PREF and the Idaho Panhandle National Forests, the scope of the analysis, the decisions to be made, and a summary of the subject matter and organization of the document.

1.2 Proposed Action Description

The Canyon Creek Research Project would manipulate forest vegetation over approximately 329 acres of the PREF. This would be accomplished by thinning trees from dense stands, favoring large western white pine, western larch, and ponderosa pine in the dominant canopy positions, and by promoting the establishment and development of early seral seedling reproduction. Under the proposed vegetation treatments, some trees would be cut and removed while

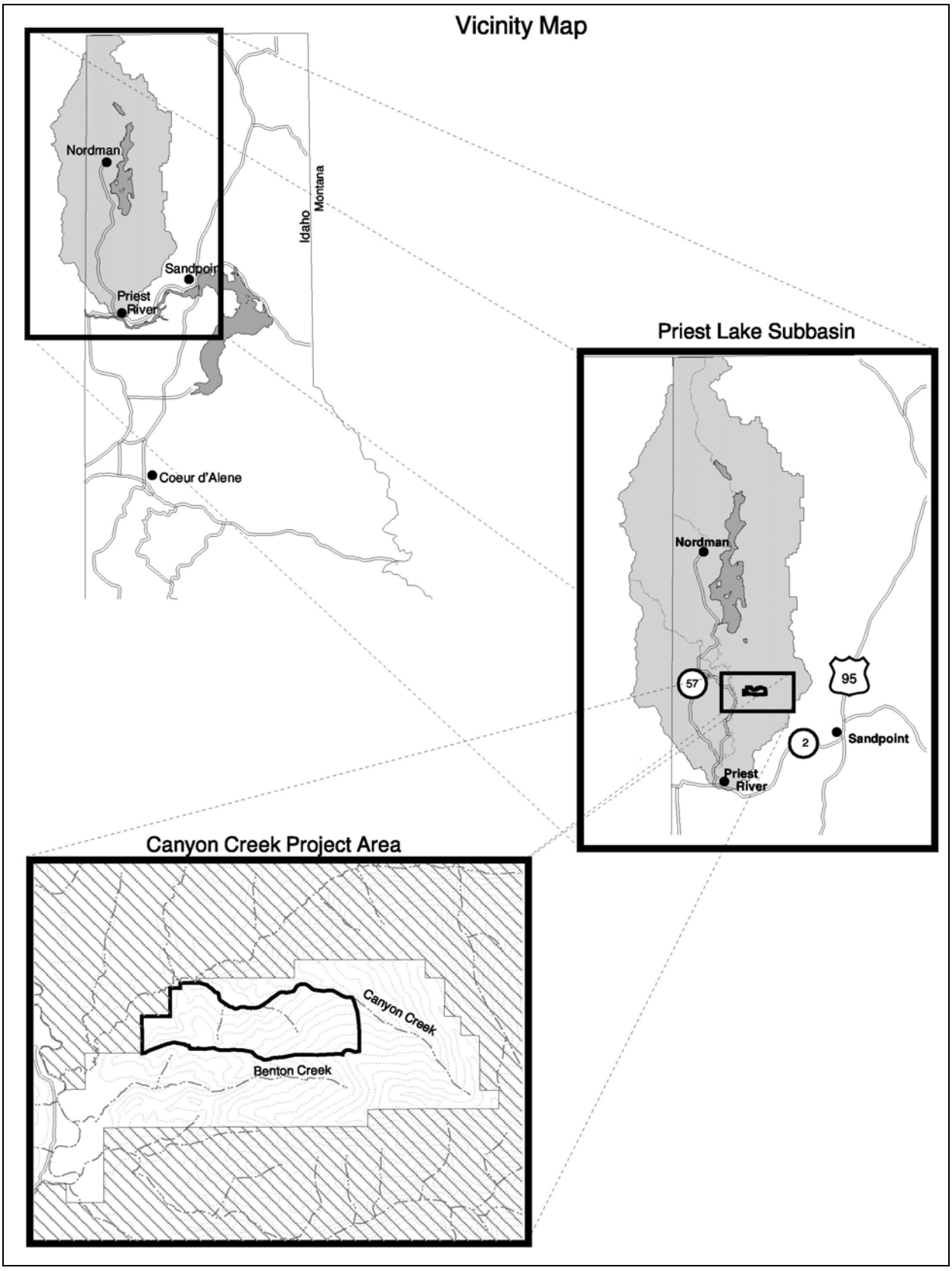

Figure 1-1. Vicinity Map.

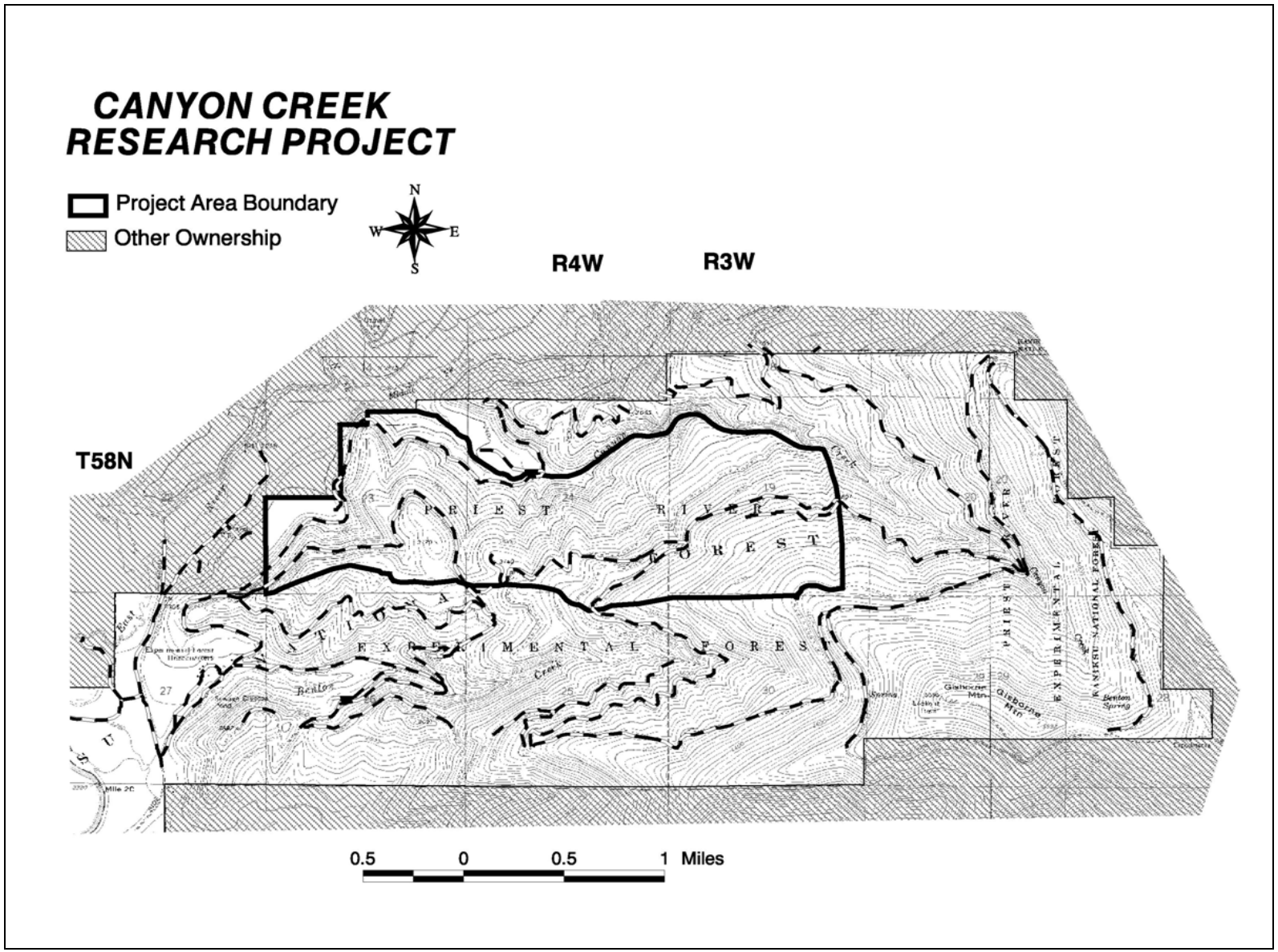

Figure 1-2. Project Area Map.

in other areas, they would be girdled and left. Four different types of treatments would be used to manipulate the vegetation. These include free selection[1], group selection[2], strip shelterwood[3], and a tree girdling treatment. These treatments would result in a variety of overstory tree densities. Slash created through these treatments would be managed by various means such as underburning, jackpot burning and mechanized piling. Some of the treatment areas would be planted with mixtures of tree species and other areas would be left to naturally regenerate.

After the stands have been treated, the establishment and development of understory vegetation would be studied and quantified using research protocols. Other ecosystem components including nutrient cycling, vegetation dynamics, species composition, gap size, shape and orientation of timber stands, water quality and fish habitat, and insect and disease activity would be evaluated as a function of the different vegetation treatments.

The cutting and removal of merchantable sized trees would be accomplished through the use of a commercial timber sale. Revenue generated by the sale would help fund activities such as tree plantings, slash and site preparation treatments, water and fishery improvement projects related to the roads. A combination of cable and ground-based logging systems would be used to remove the trees. No new roads would be constructed with this project. Approximately 16.8 miles of existing road would be treated using one of four methods. Retention maintenance (light maintenance activities) would be conducted on approximately 5.0 miles of road, and restoration maintenance (heavy maintenance work) would occur on 9.4 miles. Approximately 2.5 miles of existing road would be decommissioned (permanently removing the road), and 2.0 miles would be put into storage (temporarily closing the road by removing drainage structure, etc). A substantial amount of these road treatments are proposed in order to address water quality and fish habitat concerns over the present condition of the roads in the area.

Chapter 2 of this environmental assessment contains additional details on the proposed activities.

1.3 Purpose and Need for Action

1.31 Primary Purpose and Need for the Project

The forests of the Inland Northwest have changed significantly in the last 100 years. Fire exclusion and the introduction of white pine blister rust have altered forest composition, structure and function (Covington et al. 1994, Steele 1994,

[1] **Free selection**- Hybrid of uneven-aged silviculture that combines single-tree and group selection methods to increase the potential for regenerating shade-intolerant species (Nyland, 1996).
[2] **Group selection-** A method that removes trees in small groups or clusters to promote the regeneration of new age classes in uneven-aged stands (Nyland, 1996).
[3] **Strip shelterwood**- A regeneration method to establish a new even-aged stand under the protection of older overstory trees (Nyland 1996). In this prescription, the shelterwood treatment will be conducted in narrow strips oriented parallel to the slope direction.

Neuenschwander et al. 1999). Forests once dominated by shade-intolerant, fire-tolerant species (western white pine, western larch and ponderosa pine) have been replaced by shade-tolerant, fire-intolerant, and pest-intolerant species such as grand fir, western hemlock and western red cedar. As the composition and structure of these forests have changed, they have become more susceptible to insects such as bark beetles and diseases such as root rot and dwarf mistletoe. In many areas, fire suppression has created dense multi-storied stands of Douglas-fir and grand fir (Steele 1994). The dense forests created by the absence of disturbance also have greater fuel loading, which has resulted in increased fire danger and fires that burn with greater intensity over the landscape (Covington et al. 1994). The introduction of blister rust and the exclusion of fire along with the resulting forest composition and structural changes have degraded forest health across the Inland Northwest. This combination of factors has created conditions conducive to catastrophic outbreaks of insects, disease and wildfire (Sampson et al. 1994).

Figure 1-3. Photo depicting the typical structure and composition of the timber stands that would be manipulated. Picture was taken in a portion of proposed Unit #13.

Proactive management strategies are needed to address current forest health issues in the moist forests of the Inland Northwest. Desires for sustainable forest ecosystems are pointing to the increasing need for silvicultural treatments that would lead to forest compositions and structures more similar to historic conditions. In most areas, restoration through the use of fire alone is not a feasible or desirable option because of high levels of existing fuel loading and the subsequent risk of severe wildfire. In addition, under certain conditions, land managers might not be able to use vegetation treatments that involve the creation of large openings in the forest canopy. Potential impacts of large openings on resources such as wildlife habitat, water quality, fisheries and visual quality might not be acceptable for a given area. Therefore, there is a need to evaluate strategies that do not involve creating large openings.

In summary, the Forest Service finds a need to evaluate different silvicultural strategies (that would not create large openings or rely on just prescribe burning) to determine if they could be utilized to restore western white pine type forests to more historic conditions.

The primary purpose of the proposed research project is to test several specific silvicultural treatments and determine their value in promoting forest composition and structures more similar to historic conditions. Silvicultural treatments would be tested that would not create large openings. In addition to studying the vegetation, the research would investigate how the treatments influence nutrient dynamics, water quality, and forest insects and diseases within these western white pine ecosystems. The study would help to expand the scientific knowledge concerning forest restoration and aid in developing ecologically sound management strategies. See Appendix A for more details on the research questions the study is attempting to answer.

1.32 Secondary Purpose and Need for the Project

Currently, some roads in the project area are not drivable because they are overgrown with brush and vegetation. Some of these roads have old culverts in them and there is a growing risk that the culverts may become blocked and/or deteriorate to the extent that the pipes could fail and lead to sediment entering the streams. In addition, stream crossings on some open roads in the project area have drainage structures that are not adequate to handle high water flows; these areas are at risk for failures. The Forest Service finds that at There is a need to address these concerns because of the important fishery and water designations for the streams within and near the project area.

Canyon Creek contains westslope cutthroat trout and this trout is listed as a sensitive species on the Forest Service Regional list. In addition, the Middle Fork of the East River, to which Canyon Creek is a tributary, contains populations of bull trout. Bull trout have been listed as threatened by the US Fish and Wildlife Service. In addition, the Idaho Department of Environmental Quality (DEQ) currently is in the process of finalizing the list of water quality limited stream segments in the area. Until this process is complete, the interim policy for the East River (and Canyon Creek) is that there would be no net increase in sediments to the streams.

A secondary purpose for conducting this project is to reduce the potential sediment risk that the current road system poses to the streams in the area. In response to this goal, some roads that are not essential for long-term access needs would be decommissioned and other roads that are needed in the long-term, but are not needed in the near future, would be put into storage. In addition, some of the roads in the project area that are needed for both long-term and short-term uses would be improved. These measures would reduce the risk of sediment reaching the streams and reduce the future likelihood of road failures.

1.4 Policy Direction and Legal Guidance

Land management decisions on the Priest River Experimental Forest are governed by direction provided by the Idaho Panhandle National Forests Plan (USDA 1987), research needs identified by the Director of the Rocky Mountain Research Station and national and state laws.

1.41 Forest Plan and Rocky Mountain Research Station Direction

This proposed project is tiered to the research direction of the Rocky Mountain Research Station and is consistent with the IPNF Forest Plan direction.

Rocky Mountain Station direction for the Priest River Experimental Forest includes the following:

- The PREF, now covering approximately 6,400 acres, was established in 1911 to make available a research area for silvicultural and other related research in the moist Inland Northwest western white pine forest type.

- Tree removal is limited to that necessary for research activities or to provide areas suitable for future research programs.

- The Rocky Mountain Research Station, RMRS is responsible for the planning and coordination of all PREF activities.

- A Memorandum of Understanding (MOU) between the Research Station and the Idaho Panhandle National Forests (USDA 1992) explains the coordination necessary to administer timber sales, protect against fire, insects and diseases; and to maintain a transportation system within the PREF.

The project site lies within Management Area 14 of the Idaho Panhandle National Forest Land and Resource Management Plan (Forest Plan). Management Area 14 consists of experimental forests that are to be used for manipulative, scientific research. Forest Plan goals and standards for these lands are listed on pages III-61 through III-64 of the Forest Plan. Within this area, the Forest Plan indicates that timber harvesting may occur for research purposes (page III-64).

1.42 Forest Service Road Management and Transportation System Rule

In January 2001, the Forest Service issued a Final Rule regarding specific revisions to the road system rules at 36 CFR part 212 and to Forest Service administrative directives governing transportation analysis and management. One of the tools developed to meet objectives of the revised policy is an integrated, science-based roads analysis process that allows objective evaluation of the environmental, social and economic impacts of proposed road construction, reconstruction, maintenance, and decommissioning of roads. This process is discussed in detail in the publication "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System" (USDA 1999, Misc. Rep. FS-643). The process was followed for this project. For additional information, please refer to Appendix B.

1.43 Laws

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.

Federal Laws

- The National Environmental Policy Act (NEPA) (1970)
- The Clean Water Act (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

Executive Orders

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

1.5 Scope of the Environmental Assessment

Researchers from the Rocky Mountain Research Station, in cooperation with staff and specialists from the Idaho Panhandle National Forests, prepared this EA to document

the analysis and disclose the environmental effects of the proposed project on the human environment in the vicinity of the PREF. The research portion of the proposed project is a long-term study designed to answer specific forest management questions. In order to perform this research, forest vegetation must be manipulated in various ways. Some trees and other vegetation would be cut and/or girdled, prescribed burns and other slash disposal methods would be used, and various reforestation efforts and road improvements would be accomplished. These site-disturbing activities would occur for approximately five years from when the project is approved. During these activities, and after they are completed, researchers would monitor and study the various research topics by using non-site disturbing activities such as collecting data through measurements.

This assessment is not a general management plan for the area. It is a site-specific assessment of the potential effects of implementing the proposed research project and the proposed road improvements on the environment.

The scope of an assessment is the range of actions, alternatives, and impacts that are considered. In determining the scope of this EA, three types of actions (connected, similar, and cumulative actions), three types of alternatives (no action, other reasonable courses of action, and mitigation measures), and three types of impacts (direct, indirect and cumulative) were considered.

1.51 Actions Considered in this EA

In addition to the proposed activities that are disclosed in Chapter 2, the following past, ongoing, and foreseeable actions were also considered. Because the cumulative effects analysis (CEA) areas are different for the various issues/resources under consideration, the following activities may or may not be relevant to the individual analyses that are discussed in Chapter 3. Regarding the foreseeable future actions, those that have a reasonable chance of occurring have been identified. Additional details and maps of those actions are included in the project file.

Past and/or Ongoing Activities and Events:

- Timber harvesting and road building (and maintenance) that occurred on Forest Service (primarily associated with research projects), private and state lands in the past.
- Wildfires and other disturbance agents that historically influenced the aquatic and/or terrestrial environments (e.g., native forest insects and diseases, introduced non-native organisms such as noxious weeds, fish species and white pine blister rust disease).
- Grazing, haying, home construction and associated activities on private land in the area (historical and ongoing).
- Wildfire suppression on all the land ownerships (historical and ongoing).
- Road maintenance activities (mostly Forest Service and County- historical and ongoing).

- A variety of motorized and non-motorized recreational activities (mostly hunting, berry picking and fishing on Forest Service land- historical and ongoing).
- Activities in the PREF Headquarters (historical and ongoing).

Reasonable Foreseeable Activities on Forest Service Land:

- *Post Sale and Pre-commercial thinning activities:* Planting and fuel/site preparation activities are planned for some areas that were previously logged on the PREF. Approximately 18 acres will be underburned, four acres will be grapple piled and fourteen acres planted. In addition, approximately 16 acres of young plantations will be pre-commercially thinned. Over approximately five of these 16 acres, some overstory larch trees will be girdled to prevent the spread of dwarf mistletoe. All of the activities described above will likely occur within the next two years.

- *Noxious weed treatment along roads*: In addition to the noxious weed treatments that are part of this proposal and described in the design features, additional noxious weed treatments will occur along other roads within the PREF. Treatment of weeds would be conducted in accordance with the Priest Lake Noxious Weed Control Plan Final EIS (USDA 1997).

- *Road Maintenance:* In addition to the various road maintenance activities that would be conducted as part of the proposed action, other routine maintenance work may occur on existing open roads in the analysis area.

Reasonable Foreseeable Activities on State and Private Land:

In addition to National Forest land, some state and private land occurs within the cumulative effects analysis (CEA) areas. Within this area, the State of Idaho (Idaho Dept. of Lands) owns approximately 160 acres of land and approximately 174 acres of land are privately owned. The Idaho Department of Lands does not have any plans to conduct site-disturbing activities on the land that they administer in the foreseeable future. Approximately 145 of the 160 acres of state lands are currently heavily timbered with sawlog-sized trees. The remaining 15 acres were clearcut some years ago and are currently in sapling-sized trees.

The private land within the CEA area is a mixture of pasture and timberland with a few homes on the properties. In 1996 (the most recent aerial photo flight), approximately one-half of the area is occupied by pasture and/or riparian areas and one-half by timber of various tree-stocking levels. Since 1996, Idaho Department of Land records indicate that two large and several small harvest operations have occurred on the private lands. Therefore, the current tree stocking levels on these private lands are probably significantly less.

In order to determine if any of the private forestland owners plan to harvest in the foreseeable future, the Idaho State Department of Lands was contacted (in February of

2002 and again in June of 2002) to determine if landowners had a current permit (or had applied for one) to harvest trees on their property. As of June 2002, one private landowner who owns some land within the CEA area had obtained a permit to harvest trees (project file). Approximately 7 acres of the private land covered under the permit lies within this analysis area. However, because of access and logging feasibility issues, the logging may or may not occur (project file).

However, based on observations of harvest patterns on other private land in the Priest River/Lake area, it could be assumed that the timbered portion of all of the private lands within the analysis area would continue to be heavily managed in the future and that pastureland would continue to be grazed or otherwise used for grass production. For this EA, it was assumed that the timbered portion of the private lands (approximately 87 acres) would be kept in a state of relatively small size trees with fairly open conditions and the area would have higher road and skid trail densities than would be expected on state or Federal land.

1.52 Alternatives Considered in this EA

Three types of alternatives were considered in this EA- the no action alternative; other reasonable courses of actions; and mitigation measures not included in the proposed action. The no action alternative (Alternative 1) and the proposed action (Alternative 2) are discussed in detail in the EA. Other reasonable courses of actions and mitigation measures were considered (see Chapter 2). However, after considering several other action alternatives/mitigation measures, it was determined that they would not meet the needs and purposes for proposing the project. Therefore, these other alternatives/mitigation measures were dropped from detailed analysis.

1.53 Impacts Considered in this EA

Three types of impacts, or effects, were considered in this EA. Direct effects are caused by the action and occur at the same time and place. Indirect effects are also caused by the action but are later in time or farther removed in distance. The direct and indirect effects of the alternatives were analyzed for all resources at issue or as required by law.

Cumulative effects are the impacts on the environment, which result from the incremental effect of the proposed action when added to other past, present, and reasonably foreseeable actions. These cumulative effects are disclosed in Chapter 3.

1.6 Decisions to be Made

This environmental assessment is not a decision document. This document discloses the environmental consequences of implementing the proposed action or selecting the No Action alternative. The Deciding Officials for this project are Ranotta McNair, Supervisor of the Idaho Panhandle National Forests and Russell Graham, Director's

Representative for the Rocky Mountain Research Station. These Officials will decide on which alternative to implement.

The decision and the rationale for that decision will be described in the Canyon Creek Research Project Decision Notice that will be completed following a public comment period for this EA.

Criteria that will be used for the selection of an alternative will include how well the alternative addresses the following:

- The purpose and need for action.
- The Forest Plan and legal mandates.
- The environmental issues and concerns that were identified.

1.7 Organization of this Environmental Assessment

This assessment contains three chapters, including this one.

- Chapter 2 describes the proposed action in detail (including mitigation measures and design features), other alternatives that were considered but were dropped from detailed analysis, and the No Action alternative. This chapter presents the issues that were considered in the analysis and how they were used. The proposed action and the No Action alternative were compared at the end of this chapter relative to the environmental effects.

- Chapter 3 describes the existing condition of resources that may be affected by implementation of either alternative. The discussion, by resource, focuses on the important issues that were identified earlier in Chapter 2. Chapter 3 then describes the environmental consequences associated with implementation of either of the alternatives using the existing condition as the baseline for evaluation. Direct, indirect, and cumulative effects are discussed, along with consistency with Forest Plan direction.

The bibliography, list of team members who worked on the EA, and several appendices follow Chapter 3. The project file contains public comments from scoping efforts, and reports, analytical information, and maps that support the discussions in the EA. The project file is located at the Priest Lake Ranger District, Priest River, ID.

Chapter 2: Issues and Alternatives

2.1 Introduction

This chapter contains a description of the public scoping efforts that were undertaken and the issues that were identified. Alternatives that were considered but were eliminated from detailed analysis are discussed in this chapter. A detailed description of the proposed action and the No Action alternative is presented and at the end of the chapter these alternatives are compared to one another.

2.2 Scoping and Issue Identification

Scoping - Scoping is an open process designed to determine the potential issues associated with a proposed action and then, from this list, to further identify those issues that are significant to the decision and those which are not significant and therefore should be eliminated from detailed analysis. Public input is considered as well as that from Forest Service resource specialists, County, State and other Federal agencies, and Native American Tribes. Public scoping for this project was initiated in January of 2001 with publication in the Idaho Panhandle National Forests Quarterly Schedule of Proposed Actions. In March of 2001, a letter announcing the initiation of the research project was mailed to 37 adjacent landowners and 59 agencies, organizations and individuals interested in receiving project proposals. Three local newspapers were also sent copies of the scoping notice. In response to these efforts, we received twelve letters; eleven submitted comments and one requested future information. The project has continued to be listed on the quarterly schedule.

The Interdisciplinary Team (IDT) that prepared this EA considered the comments and incorporated them into the project and analysis when possible. A list of the comments and a description of how they were used in this analysis is provided in Appendix C.

Issues - Issues can be defined as discussions, debates or disputes about the effects that actions would have upon the environment. The Interdisciplinary Team reviewed each of the potential issues that were identified through the scoping process. Each issue was considered to determine if/how it is related to the proposal and the level of potential impact. A decision was then made either to address the issue in detail in this EA or not. Those issues addressed in detail are described below and they are called Analysis Issues. The other issues that were not analyzed in detail are briefly discussed in Appendix C. The issues that were not addressed in detail were dismissed because: 1) they were beyond the scope of the project; 2) there would be little or no effect to the issue or concern; or 3) the issue had been effectively addressed through specific design features and/or mitigation measures.

2.21 Analysis Issues

For each of the following analysis issues, the IDT identified indicators to measure how the issue would be affected by the alternatives. The effects that the alternatives would have on these issues are described in detail in Chapter 3 of this document.

Issue #1 - Effects of project activities on water quality and fish habitat

Comments concerning aquatic resources were received from three organizations and the Idaho Dept. of Environmental Quality (DEQ). Those who commented requested that potential effects to aquatic resources be analyzed. In addition, DEQ indicated that until the 303(d) listing process is complete, the interim policy for the East River (which Canyon Creek flows into) is that activities should not produce a net increase in sediments to the river.

Streams within or near the project area contain populations of bull trout and westslope cutthroat trout that depend upon high quality habitat to complete their life cycles. Westslope cutthroat trout are listed as a sensitive species on the Forest Service Regional list, and bull trout have been listed as threatened by the US Fish and Wildlife Service. As a result of these special designations, proposed activities may not degrade the habitat for these species.

The proposed project includes ground-disturbing activities such as timber harvesting, tree girdling, prescribe burning, road reconstruction, road decommissioning and culvert removal. If done improperly or under the wrong conditions, these kinds of activities could potentially cause adverse impacts to water quality and fish habitat. However, if done correctly, some of these activities could improve the current condition and/or reduce the risk to aquatic resources.

Addressing the Issue: For the reasons stated above, the effects that the proposed project could have on water quality and fish habitat were carefully considered. Where possible, activities that might improve water quality and fish habitat were included as part of this proposed project, or they were considered for future improvement projects. In addition, certain measures were adopted to minimize any potential negative affects that the proposal could have on aquatic resources.

Issue Indicators: Three factors were selected for detailed analysis in this EA and these are briefly discussed below. Appendix H contains a discussion of why other factors were not considered in detail.

Risk of Stream Crossing Failure – Within the Canyon Creek Research project area, stream crossings on some roads have old culverts that are beginning to deteriorate; some other culverts are “undersized”. Because of these conditions, the Forest Service is concerned that these culverts could fail to function and result in road failures. A qualitative assessment (using low, moderate, and high) will be used to rate the risk of

crossing failures.

Sediment Production and Delivery - Some of the activities that have been proposed for this research project could potentially increase the amount of sediment reaching the streams. For example, even though replacing old or undersized culverts would decrease the probability of a future road failure, during the actual removal and/or replacement of the culverts, some sediment may be released into the stream. As another example, tree cutting and removal could cause rainfall to be concentrated, and sediment production to streams could potentially increase. The measures that will be used to predict how the alternatives would affect sediment production and delivery include the following:

- WATSED modeling results of sediment increases
- Qualitative discussion of how the proposed activities may affect the delivery of sediment considering the type of activities
- The location of activities relative to streams and sensitive landtypes and soils
- Design criteria/mitigation measures that are specified.

Water yield increases - When vegetation is removed from a timbered site, the amount of surface and subsurface water flowing into a stream can increase. Depending on many factors, this increase in water yield can lead to instream channel erosion, which, in turn can degrade fish habitat. The measures that will be used to predict how much the water yield would increase are the results from the WATSED model.

Issue #2 - Effects of project activities on Threatened, Endangered, Sensitive and Management Indicator Wildlife species

Three organizations requested that potential effects to Threatened, Endangered, Sensitive (TES) and Management Indicator wildlife species be analyzed in the EA. In addition, the Endangered Species Act directs federal agencies to ensure that their activities are not likely to jeopardize the continued existence of any Threatened or Endangered species or result in the destruction or adverse modification to their critical habitat.

The Canyon Creek Research Project area contains habitat for the following TES and management indicator species: bald eagle, gray wolf, fisher, flammulated owl, black-backed woodpecker, white-headed woodpecker, boreal toad, northern goshawk, American marten, moose, white-tailed deer, and pileated woodpecker.

The proposed project would involve manipulating forests and roads through various activities. Activities such as those being proposed can alter the amount, suitability and distribution of habitat for wildlife species. These effects could be beneficial, neutral, or harmful for the populations depending on the habitat requirements of the particular wildlife species being considered and the intensity of effects.

Addressing the Issue: Within this EA, the potential effects were analyzed in detail for

fisher, marten, flammulated owl, northern goshawk, and black-backed, pileated and white-headed woodpeckers. The rationale on why other species were not addressed in detail is provided in the wildlife section of Chapter 3 of this EA and within the project file.

In addition to considering how the activities might affect these species, certain protection measures were identified to eliminate or minimize any detrimental effects that the proposal would have upon wildlife species.

Issue indicators:

- Effects to suitable and capable habitat, habitat connectivity and human activities and access for marten and fisher.
- The effects to suitable and capable habitat for flammulated owl, white-headed woodpecker and northern goshawk.
- The changes in distribution and quality of snag habitat for black-backed and pileated woodpeckers.

Issue #3 - Effects of project activities on Sensitive plants and Forest species of concern

Occurrences of a sensitive moss species (*Buxbaumia viridis*) are documented in the project area. This moss grows on well-deayed wood in moist to mesic conifer forests. Deerfern (*Blechnum spicant*) also occurs in the project area, along an open road. The project area also contains suitable habitat for sensitive moonworts (*Botrychium* species) and other moist and wet forest sensitive species

Addressing the Issue: The potential effects that the proposed activities would have on sensitive species and Forest species of concern were analyzed in detail in this EA. In addition, protection measures were identified to minimize any detrimental effects that the proposal could have on this species.

Issue indicators:

- Amount of disturbance of substrate (rotted wood) that supports or is capable of supporting *Buxbaumia viridis*.
- Amount of soil and/or canopy disturbance in suitable habitat for sensitive *Botrychium* species and other sensitive moist and wet forest plant species.

Issue #4- Effects of project activities on soil productivity

Two organizations submitted comments on soil productivity. One comment requested that the Forest Service determine if nutrient limitations existed on the sites proposed for treatments. The other comment requested that potential soil impacts be considered.

Ground disturbing activities such as skidding logs across the soil surface or operating machinery across an area can cause negative impacts to the productivity of the soil. Other potential impacts on soil productivity include land taken out of production (e.g., roads, landings and skid trails), units with insufficient large woody debris left on site, areas which have burned too hot and removing nutrients from the site.

Addressing the Issue: For the reasons stated above, the potential impacts that the proposed activities could have on the productivity of the soils was analyzed in detail. In addition, design criteria and mitigation measures were included into the proposed action to minimize impacts.

Issue Indicators:

- Increase in amount of detrimentally disturbed soil
- Acres harvested on potassium limited soils

Issue #5- Effects of project on noxious weed invasion and spread

In response to the scoping letter sent to the public, a landowner living adjacent to the Experimental Forests inquired how the noxious weeds would be managed. Several weed species are documented along open and closed roads in the project area. Ground and vegetation disturbing activities have the potential to spread existing weed infestations and introduce new weed invaders.

Addressing the Issue: The potential effects that the proposed activities would have on existing weed infestations and introduction of new weed invaders were analyzed in detail in this EA. In addition, preventive measures were identified to reduce weed introduction and spread.

Issue indicator:

- Amount of canopy removal and ground or understory vegetation disturbance.

2.22 Issues Eliminated From Detailed Analysis

The following issues were considered by the IDT but they were eliminated from detailed analysis. Appendix C contains a brief discussion on why they were eliminated.

- Effects of project activities on old growth stands
- Effects of project activities on neotropical birds
- Effects of project activities on fragmentation and corridors
- Effects of project activities on social and economic factors
- Effects of project activities on general species viability
- Ability to control prescribe burns
- Purpose and need for the project

- Effects of project on heritage resources
- Effects of project on roadless areas
- Effects of project on road access
- Effects to low Income or minority populations
- Effects to Threatened or Endangered plant species
- Effects on visual quality
- Effects of livestock grazing
- Effects to forest vegetation

2.3 Alternative Development and Modification

Once issues were identified, the IDT considered whether or not there were any alternatives to the proposed action that would address the issues while still meeting the underlying needs for the project as well as the specific purposes for proposing it. In response to the public scoping efforts that were undertaken, the public requested that some other alternatives and mitigation measures be considered. These are discussed below. However, because the purpose and need for the proposed research project is very specific, no other alternatives (or mitigation measures) were identified that would fulfill both the needs and the purposes for proposing the project. Therefore, the alternatives were not studied in detail.

2.31 Alternatives Considered But Eliminated from Further Study

1) Restoration only alternatives

One group that commented on the project requested that the Forest Service consider an alternative that would conduct restoration activities without harvesting trees and that emphasized natural disturbance processes. The commenter stated; “The purpose and need of the project can be met more efficiently through means other than commercial timber harvest and those means must be given unbiased attention.”

In response to this request, three types of alternatives were considered that did not involve cutting and/or selling trees. These were then evaluated to determine if they would meet the purpose and needs identified for the project. These alternatives are: (1) watershed restoration only, (2) watershed restoration and prescribe fire, and (3) proposed action without a commercial timber harvest. Each of these alternatives are discussed below.

Watershed restoration only- this alternative would conduct all of the road treatment activities identified in the proposed action (Alternative 2) that would benefit the watershed/fishery resources. This includes activities such as the road decommissioning, road storage and most of the road maintenance work. By conducting this work, the alternative would meet the secondary purpose and need for the project- to reduce the sediment risk that the current road system poses to the streams in the area. However, this alternative would not help develop vegetation restoration strategies and would not test various silvicultural treatments. Therefore, this alternative would not

meet the primary purpose or the primary need for the project and therefore, this alternative was eliminated from further analysis.

Watershed restoration and prescribed fire - this alternative would conduct all of the watershed restoration activities identified above and it would utilize prescribe fire (rather than tree cutting and prescribe fire) as a tool to manipulate the vegetation.

As discussed in Chapter 1, in most of the moist forests of the Inland Northwest, restoration through the use of prescribe fires alone is not a feasible or desirable option because of the risk of high intensity fires. The main need that was identified for the project was to develop other restoration strategies (other than just using fire) and the primary purpose was to test some specific silvicultural treatments. Therefore, an alternative that only included prescribed fire would not meet the primary purpose and need for the project. As discussed below, it would also not be feasible to just use fire as a tool to manipulate the stands.

In order to research the restoration value of the various silvicultural treatments, the study requires that trees of a certain species, size, and condition be cut while leaving the others (see Appendix 1 for more details). The study also requires that the trees be cut in a certain pattern and intensity. In addition, most of the treatments are replicated over two different units and post treatment stand conditions need to be very similar between each pair of units for the study to be scientifically meaningful. The use of fire alone as a tool to kill a very select portion of the trees and to do so in the required pattern is not feasible. In all likelihood, too many, too few, and/or the wrong species or pattern of trees would be killed. Also, the post-treatment conditions would be different from those that would be created by the proposed treatments. The one partial exception to that statement is for Unit #6. The treatment that would be applied to that unit is designed primarily as a watershed study and would approximate a stand replacement disturbance (through tree girdling and prescribe fire). As compared to the other silvicultural treatments in the proposed research project, this one would not require the same high level of precision as to which trees are killed. In addition, the topography and fuel conditions (because of the proposed tree girdling) allow the unit to be burned without cutting trees.

In addition to not having enough control over which trees would be killed, the risk of a fire escaping control would be high for most of the proposed units if fire were used without tree cutting. Under the dense canopy that exists within most of the proposed treatment areas, by the time the surface fuels in the planned burn area were to dry out enough to carry a ground fire, the surrounding area would be as dry or drier. This situation creates a high risk that a controlled burn would escape or develop into a crown fire. The relatively close proximity of private land as well as the important resources (including the existing long-term research studies in the area) in the PREF makes this risk unacceptable.

Although this alternative would meet the secondary purpose and need for the project (the watershed and fishery road improvement work), it was eliminated from further

consideration because it would not meet the main need and purpose for the project.

Proposed Action without commercial harvest - This alternative would conduct all of the activities identified in the proposed action (Alternative 2) except the merchantable trees that are cut would not be sold.

In order to meet the fuel treatment and site conditions necessary for the research, felled trees (or a portion of them) would need to be yarded to the roads. If all of the felled trees were left in the unit, the fuel loading would be very high and the subsequent fuel and regeneration treatments associated with the project would be difficult. In addition, the project was designed to test different silvicultural treatments that all involve (with the exception of unit #6) cutting and removing trees in different patterns and intensities. If the trees were cut and left, the conditions would not be the same as those that the proposed treatments would create. Therefore, to meet the objectives of the research, the cut trees would have to be yarded out of the units. The trees would either have to be burned in piles at landings (which would require large areas) or hauled away. This alternative would require that the Forest Service pay someone to cut, yard and burn the trees and this would cost a significant amount of money.

If the trees were sold, the contractors would remove them from the treatment areas and the government would receive money (or services such as road improvement work). Funds that are available for research are very limited and if the trees were sold, part of this money could be used to conduct the fuel and site preparation activities and pay for the tree planting. Part of the revenue from the sale of the trees would also be used to conduct the road treatments that were included in the proposed action to address watershed and fishery concerns.

The IPNF Forest Plan direction for the PREF allows the use of timber sales if the sales are consistent with research objectives.

This alternative would not meet the primary purpose and need for the project and it would not be economically or socially reasonable. For these reasons, this alternative was eliminated from further study.

2) Conduct research somewhere else where harvesting has already occurred

A comment was received from a group that suggested that the research project be conducted in a different location where openings had already been created. Conducting the study within the experimental forest helps protect the future integrity of the study by being able to control activities surrounding the experimental area. Likewise, initiating the study within the experimental forest allows for the side-by-side replication of the treatments in areas with similar environmental attributes. If the study were implemented in previously manipulated areas (uncontrolled and non-randomly selected), the experimental design and random stand selection would be compromised. This would greatly diminish the integrity of the study design, the ability to account for environmental variation, and the identification of cause and effect relationships. Therefore, this

proposed alternative would not meet the primary purpose and need for the project and it was eliminated from further study.

3) No vegetative treatment of timber stands that meet old growth criteria

The proposed action includes manipulating vegetation over approximately 24 acres that occur within timber stands that currently meet old growth criteria. This includes portions of proposed Units #11 and #13. In response to some public comments that were received from one group, the ID Team considered an alternative that would not include cutting of any trees (or otherwise manipulating the vegetation) within the stands that currently meet old growth criteria. This alternative would be the same as the proposed action except that the 24 acres that currently meet old growth would be excluded from this alternative.

As discussed in Appendix A, one of the specific objectives of the proposed research is to evaluate vegetative treatments to determine if they could be utilized to maintain and/or enhance old growth forest structures and compositions. If the treatment of old growth were excluded, this objective would not be achieved. Therefore, this alternative was dropped from detailed analysis because it would not meet the entire purpose for proposing the research project. In Appendix C within the section titled “Issues eliminated from detailed analysis”, there is more information on old growth within the PREF.

2.32 Alternatives Considered In Detail

The No Action and Proposed Action Alternatives are described in detail in this section. This includes a discussion of the design criteria, mitigation measures and monitoring activities associated with the Proposed Action.

2.32a Alternative 1 - No Action

Alternative 1 is the No Action alternative. This alternative is required by law and serves both as a viable alternative as well as a baseline for comparison of the effects of the action alternatives. Under this alternative, no actions would be undertaken to respond to the needs for proposing the project, and therefore the purposes for the project would not be achieved. Under this alternative, the research study would not be conducted at this time. In addition, road treatments designed to improve water quality and fishery habitat would not occur. The resource improvement projects and the actions identified in the design features would also not be implemented.

2.32b Alternative 2 - Proposed Action

Alternative 2 was designed to fully meet the needs for the project and the purposes for proposing it. The research project would manipulate vegetation over approximately 329 acres within the Priest River Experimental Forest and conduct road and watershed improvement related activities. These actions are discussed in more detail below.

1. *Silviculture Treatments and Logging Methods*

Approximately 329 acres would be treated using group selection, free selection, strip shelterwood, and girdling treatments. A portion of the trees would be removed or girdled in these treatments to create a variety of stand structures (*Nyland 1996, Smith et al. 1997*). Figure 2-1 shows the location of these treatment units within the project area.

As shown in table 2-1, there are a total of 13 units and some form of vegetation manipulation would occur in 12 units. Unit #7 would act as a control for the research and would not be treated. In order to achieve a strong statistical design for the research, there are replications of the silvicultural treatments. This is to insure that inferences can be made and statistical analysis can be conducted on data collected throughout the duration of the study.

The number of acres listed in table 2-1 represents the approximate acres that would actually be manipulated (or treated). Four of the proposed units (4, 9, 11 and 13) are larger in size than is indicated in that table. Some of the areas within those units would not be treated so those acres were not included in the table.

The residual stand densities in table 2-1 would range from a low density favoring mature pines and other species to a higher density containing a mixture of western red cedar, western hemlock, western larch, western white pine and a mix of other seral species depending on what conditions are present in existing stands. Appendix A contains a more detailed description of the existing forest conditions within each unit as well as the prescribed treatment.

For each unit, table 2-1 illustrates the prescription for the unit, the current canopy closure and the residual cover after treatment. In addition, the table lists what kind of logging method, fuel treatment and regeneration method would be used. Table 2-2 presents a summary of the acres that would be treated by each silvicultural prescription, fuel/site preparation treatment, and logging system.

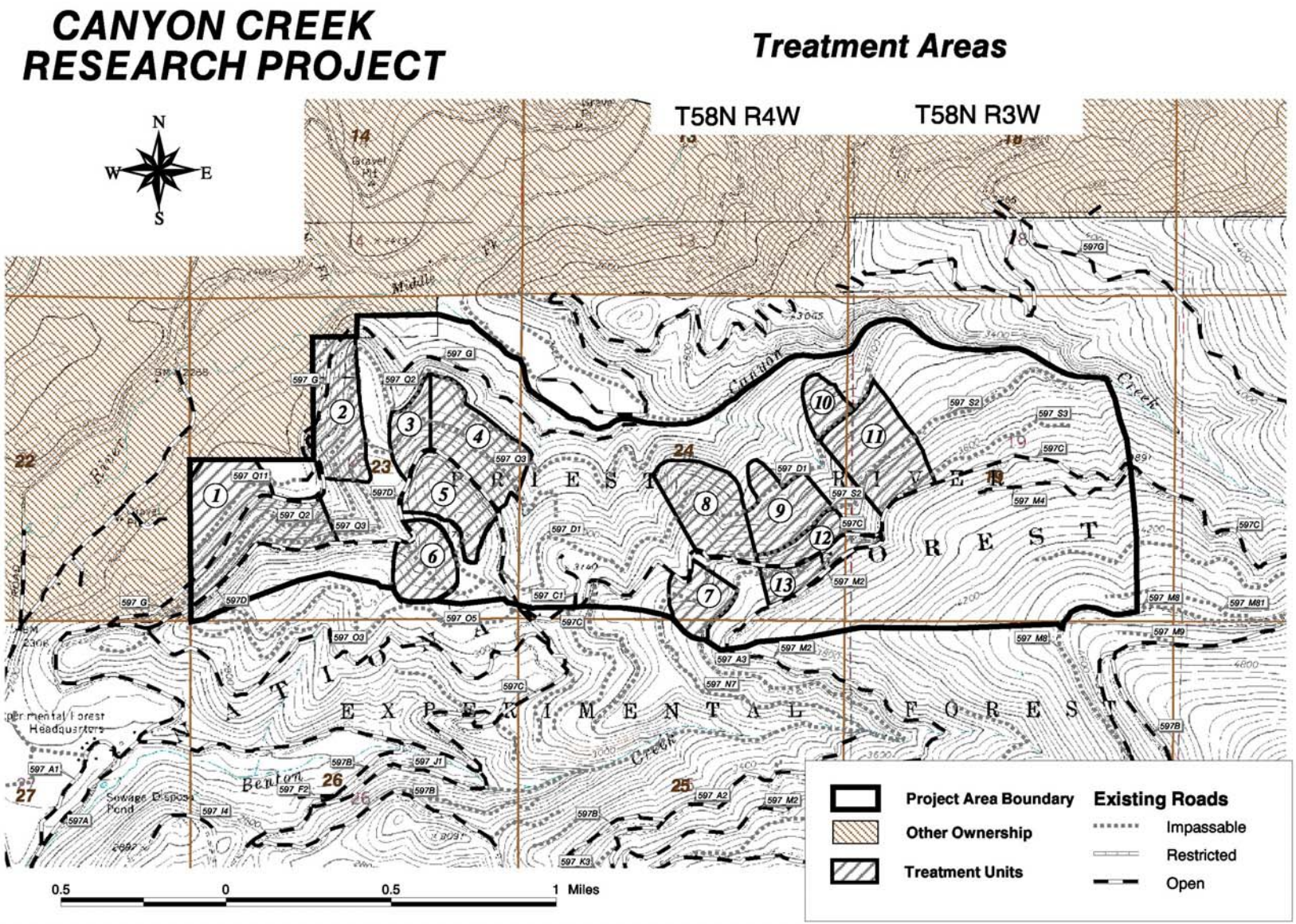

Figure 2-1. Map of vegetation treatment areas.

Table 2-1: Description of Stand Prescriptions

Prescription and Treatment Acres by Unit #	Current Canopy Cover	Residual Canopy Cover	Logging Method	Fuel Treatments And Site Preparation	Regeneration Method
Unit 1: Free Selection (68 Acres)	80%	40 to 65%	Skyline (68 acres)	Jackpot burn (5 acres);	Mixture of natural and artificial western white pine
Unit 2: Free Selection (40 acres)	65%	50%	Skyline (40 acres)	Underburn (40 acres)	Mix of natural and artificial ponderosa regeneration
Unit 3: Free Selection (15 Acres)	80%	40 to 65%	Skyline (15 acres)	Jackpot burn (3 acres);	Mixture of natural and artificial western white pine
Unit 4: Strip Shelterwood (20 acres); Free Selection (5 acres)	70%	20% (Strip Shelterwood); 40-60% (Free Selection)	Skyline (17 acres); Ground (8 acres)	Jackpot burn (20 acres); Grapple Pile (5 acres)	Interplant with a mixture of western white pine, western red cedar and western larch
Unit 5: Group Selection (6 acres); Free Selection (25 acres)	70%	55% (Free Selection); 25% (Group Selection)	Ground (31 Acres)	Jackpot (31 acres)	Mixture of natural and artificial western white pine and western larch
Unit 6: Tree Girdling (25 acres)	70%	35%	N/A	Underburn (25 acres)	Natural
Unit 7: No harvest (control)	90%	90%	N/A	None	Natural
Unit 8: Free Selection (39 Acres)	80%	40 to 65%	Skyline (39 acres)	Jackpot burn (5 acres);	Mixture of natural and Artificial western white pine
Unit 9: Strip Shelterwood (10 acres); Free Selection (3 acres)	70%	20% (Strip Shelterwood); 40-60% (Free Selection)	Skyline (10 acres); Ground (3 acres)	Jackpot burn (10 acres); Grapple Pile (3 acres)	Interplant with a mixture of western white pine, western red cedar and western
Unit 10: Free Selection (20 acres)	80%	60%	Skyline (20 acres)	None	Natural
Unit 11: Strip Shelterwood (20 acres); Free Selection (10 acres)	70%	20% (Strip Shelterwood); 40-60% (Free Selection)	Skyline (22 acres); Ground (8 acres)	Jackpot burn (26 acres); Grapple Pile (4 acres)	Interplant with a mixture of western white pine, western red cedar and western larch
Unit 12: Group Selection (3 acres); Free Selection (10 acres)	70%	55% (Free Selection); 25% (Group Selection)	Skyline (10 acres); Ground (3 acres)	Jackpot burn (3 acres);	Mixture of natural and artificial western white pine and western larch
Unit 13: Strip Shelterwood (6 acres); Free Selection (4 acres)	70%	20% (Strip Shelterwood); 40-60% (Free Selection)	Skyline (10 acres)	Jackpot burn (6 acres);	Interplant with a mixture of western white pine, western red cedar and western larch

Table 2-2: Total Area of Prescribed Activities by Application Type and Treatment.

Activities	Treatment	Total Acres
Silvicutural Prescription	Free Selection	239
	Strip Shelterwood	56
	Group Selection	9
	Tree Girdling	25
Fuel Treatments/ Site Preparation	Jackpot Burn	109
	Underburn	65
	Grapple Piling	12
Logging Systems	Skyline	251
	Ground Based	53

2. *Road Treatments*

Under this alternative, 16.8 miles of road would be treated using four levels of treatment. These include a light maintenance treatment called retention maintenance, a more intensive maintenance activity called restoration maintenance, a road storage treatment and a road decommissioning treatment. Abbreviated definitions and descriptions of these treatments are provided below. Appendix B contains a more thorough discussion of these treatments as well as a description of the proposed activities for each road. Figure 2-2 displays the roads that would be treated by treatment method.

Retention Maintenance - Retention maintenance is the ongoing upkeep of a road that is necessary to retain the road at the approved management level. The work is generally minor in nature and most work includes activities such as; road blading, cleaning drainage structures, removal of minor slide material, roadway brushing, spot graveling and dust abatement.

Under this alternative, retention maintenance activities would be performed on 5.0 miles of road. All of these roads are currently drivable. On these roads, the majority of the work would include blading and brushing the roads and cleaning drainage structures.

Restoration Maintenance - Restoration maintenance is the work that is necessary to restore the road to the approved road management level. This involves work that is needed to open up the road, repair damage, improve drainage, stabilize the roadway, or provide for user safety. This may include much of the same work as described under retention maintenance. However, more intensive work may be needed, such as removal and/or installation of culverts, rolling dips, catch basins and ditches; placement of gravel on the roadbed; clearing and grubbing.

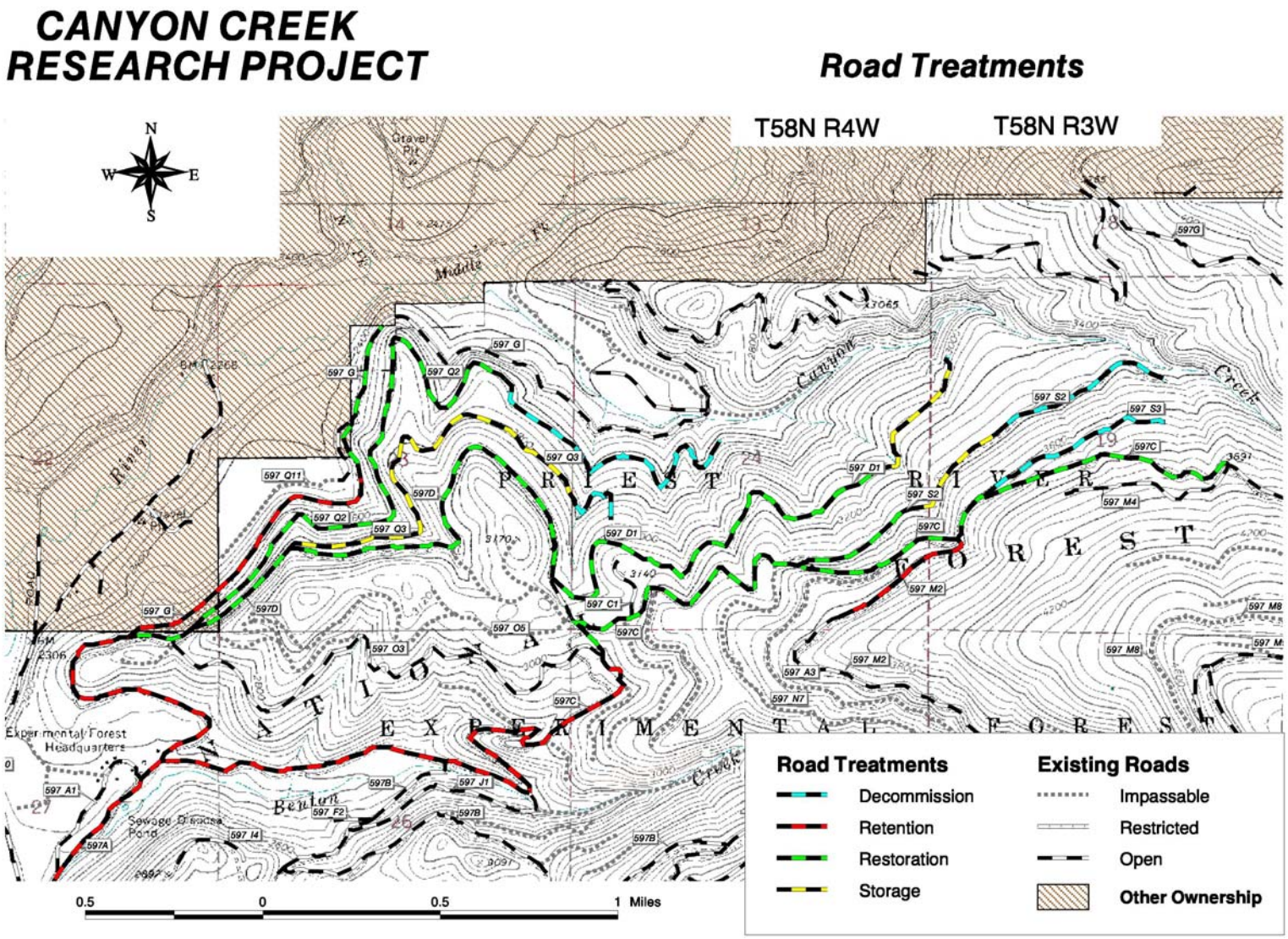

Figure 2-2. Map of proposed road treatments.

Restoration maintenance would occur on 9.4 miles of roads under this alternative. Approximately 3.7 miles of these roads are currently drivable and 5.7 miles are currently brushed closed. On these roads the majority of the proposed work includes removal and replacement of culverts, adding additional drainage structures, roadway brushing, clearing and grading roadbeds, drainage excavation, gravel placement and gate installation. Gates would be installed on the roads that are currently brushed closed that would be re-opened.

Decommissioning - Decommissioning results in the stabilization and restoration of unneeded roads to a more natural state. Decommissioned roads are removed from the Forest Transportation System. Treatments to decommission a road may include one or more types of activities and these are listed in Appendix B.

Under this alternative, 2.5 miles of road would be decommissioned. The roads would be treated by the removal and recontouring of all stream crossings and, as needed, recontouring of unstable fill slopes, cutslope stabilization, ripping and placement of woody debris and mulch on the roadbed, installation of cross ditches and grass seeding.

Storage – Storage is the activity that results in the stabilization or restoration of classified roads to a more natural state until the road is needed again. Storage may include one or more of the treatments described under decommissioning. Roads would be effectively blocked.

Under this alternative, approximately 2.0 miles of roads would be put into storage; these roads would be treated in a similar fashion as those described above for decommissioning.

In order to conduct the proposed road treatments, it would be necessary to remove rock material from an existing gravel pit and a borrow site. Both of these areas are located on the PREF (the project file contains a map of these areas). Within the existing gravel pit, rock material would be removed from the area that has already been cleared. In addition, this gravel pit would be expanded to the north by approximately 0.1 acres to provide the necessary quantity of rock. A small amount of rock material of a larger size would also be removed from an existing borrow site along Forest Service Road 597C. No additional clearing would be necessary at this site.

3. *Design Criteria And Mitigation Measures*

Design criteria are features that direct the location and extent of the activities, while mitigation measures are features designed to reduce the environmental effects of the proposed activities.

For mitigation measures, the resource specialists and IDT predicted the effectiveness of the measures. In general, effectiveness ratings are based on literature and research, administrative studies, professional experience and logic, and results of previous

monitoring.

Prescribed Fire Activities and Air Quality - Most of the prescribed burning proposed for this project could be accomplished without constructing mechanical fire lines. However, a short segment of excavator fireline may be necessary where unit #2 abuts private property at the bottom of the unit. Construction of hand fireline may be necessary around a small portion of unit #2 and unit #6.

All burning activities would comply with Idaho air quality laws and guidelines. Burning is permitted only when air quality, atmospheric conditions and proposed prescribed burning amounts and locations would allow smoke production to be in compliance with the Clean Air Act. Procedures outlined in the North Idaho Smoke Management Memorandum of Agreement (1990) would be followed, and restrictions imposed by the monitoring unit would be accepted. If there is a restriction on burning, the restrictions are followed in accordance with direction from the local airshed coordinator. These 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 cessation (North Idaho Cooperative Smoke Management Plan, 1990).

Restrictions on prescribed burning for local air quality reasons also may be implemented in addition to those imposed by the smoke management, monitoring unit. The Idaho Division of Environmental Quality recognizes this process 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.

Aquatic Resources - Site-specific Best Management Practices (BMPs) would be incorporated to ensure protection of aquatic and soil resources. Best Management Practices are the primary mechanism to enable the achievement of water quality standards. The Forest Service Handbook 2509.22 (Soil and Water Conservation Handbook) outlines Best Management Practices that meet the intent of the water quality protection elements of the Idaho Forest Practices Act. State-recognized BMPs that would be used during project design and implementation are contained in these documents:

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

The selection and design of BMPs are an integral part of the Idaho Panhandle National Forests' Land and Resource Management Plan Standards and Guidelines for Water (Forest Plan, pages II-33 and Appendix S). The BMPs applicable to this project are included as (Appendix G). The objective of this appendix is to provide conservation

practices for use on National Forest Lands to minimize the effects of management activities on soil and water resources. The conservation practices were compiled from Forest Service manuals, handbooks, contract and permit provisions, to directly or indirectly improve water quality, reduce losses in soil productivity and erosion, and abate or mitigate management effects, while meeting other resource goals and objectives. Roading and yarding mitigation would have a moderate to high level of estimated effectiveness. The measures that would be required in the contract would have a high level of effectiveness.

The Inland Native Fish Strategy (INFS) would be implemented to avoid potential negative impacts to aquatic resources. The Forest Plan for the Idaho Panhandle National Forests provides management goals and objectives for the protection of the fisheries resource. The Inland Native Fish Strategy (INFS) amended the IPNF Forest Plan management area direction in August 1995, and added standards and guidelines to protect water and aquatic biota. Riparian Habitat Conservation Areas (RHCAs) are portions of watersheds where riparian-dependent resources receive primary emphasis and where management activities would follow these standards and guidelines. RHCAs include riparian corridors, perennial fish and non-fish bearing streams, intermittent streams, wetlands, and other areas that help maintain the integrity of aquatic ecosystems by:

- Influencing the delivery of coarse sediment, organic matter, and woody debris to streams.
- Providing root strength for channel stability.
- Shading the stream
- Protecting water quality (USDA, 1995, p.A-4).

Buffer widths were determined for RHCAs in the project area and are based on the INFS (1995). In one instance (Unit #6), a standard RHCA buffer width was modified by aquatic specialists to better meet research objectives. Proposed activities for this unit include girdling some trees and underburning the unit; these activities would occur within the standard 50-foot buffer for the intermittent channel in this unit. The riparian management objectives would be met in this area. These standards and guidelines have a high effectiveness in maintaining the integrity of aquatic ecosystems. Applicable INFS standards and guidelines are addressed in Appendix H.

Heritage Resources - A goal of the Forest Service heritage resource program is to manage heritage resources to prevent loss or damage before they can be evaluated for scientific study, interpretive services or other appropriate uses. If any heritage resource sites or human remains were located during project implementation, activities would be altered or stopped to ensure protection measures are taken. The standard heritage resources protection provision (Protection of Cultural Resources, 1/93) would be included in the project contracts. The provision requires that the contractors and the Forest Service representatives work together to protect historic properties. Failure of the contractor to identify historical properties that are encountered would constitute a breach of contract. The provision specifically requires the contractor to notify the Forest

Service of any discovery. Mitigation of impacts would include, but are not limited to:

- Establishment of buffer zones,
- Directional falling,
- Alteration of unit boundaries,
- Changes in road locations,
- Designation of skid trails away from historic properties,
- Limiting the harvest methods in certain areas,
- Seasonal limitations, and
- Limiting slash disposal and tree planting activities.

This mitigation would have a high estimated effectiveness. Special contract provisions for protection of cultural resources are utilized in all contracts and have been effective in protecting heritage resources.

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.

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 to be potential new invaders is included in the project file.

Any priority weed species (as defined by the IPNF Weed Specialist) identified during road maintenance would be reported to the District Weed Specialist. A list of priority weed species is included in the project file.

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

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

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

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

Road segments identified for weed treatment and proposed for storage or decommissioning would be treated prior to decommissioning.

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 to high; the measures are expected to be somewhat to very effective at reducing the spread of these in the project area.

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

The following tractor skidtrail spacing would be used:

- All new skid trails would be designated.
- Where terrain is conducive, trails would be spaced 100 feet or more apart, except where converging.
- Skidtrail spacing closer than listed above may be planned when winter logging occurs on at least two feet or more of snow or on frozen ground.

This measure would have a high effectiveness in meeting Forest Plan standards for soil disturbance to less than 15% of the activity area. Forest plan monitoring has shown that by using these measures, less ground would be impacted (Niehoff, 2002c).

To reduce the potential from hot burns, burning would be limited to those times when the surface inch of mineral soil has soil moisture exceeding 25 percent. This measure is highly effective in retaining the fine soil organic component, based upon past IPNF soil monitoring (Niehoff, 1985).

Under all alternatives, nutrient cycling would be provided by leaving the following amounts of down woody debris and organic material on-site. The woody debris left would have a sizable component of 6-inch+ diameter material distributed across the unit. Management of coarse woody debris and organic matter in cutting units would follow the research guidelines contained in Graham and others (1994). By habitat types, the following amounts of down woody debris would be maintained:

Douglas-fir/ninebark (dry-sites)	6.6 to 13.2 tons/acre
Western hemlock/queencup beadlily (wet sites)	16.5 to 33 tons/acre

This measure would have a high estimated effectiveness, based on research recommendations, in maintaining long-term soil productivity (Graham et al 1994).

In order to protect the general nutrient capital of the site, as well as the specific nutrient potassium, the Intermountain Forest Tree Nutrition Cooperative (IFTNC) has developed management recommendations. These would be followed and include:

- Practice conventional removal rather than whole tree removal.

- Let slash remain on site over winter so mobile nutrients such as potassium can leach from fine materials back to the soil.
- Light broadcast burn or underburn for release of potassium and other nutrients.
- Avoid mechanical site preparation on ground not protected by snow or slash.
- Plant species appropriate to site.

The estimated effectiveness of this measure is high, based on research recommendations (Garrison and Moore, 1998), in retaining potassium and other nutrients on the site.

Sensitive Plants and Forest Species of Concern - Sensitive plant surveys would be conducted as needed prior to weed treatment activities.

The documented occurrences of *Buxbaumia viridis* and *Blechnum spicant* would be protected by project design.

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 exclude documented occurrences from project activities
- Modifying harvest methods, fuels treatment or logging systems to protect TES plants and their habitat
- Implementing, if necessary, Timber Sale Contract provisions B(T)6.251, Protection of Endangered Species, and C(T)9.51, Settlement for Environmental Cancellation.

Effectiveness of the above measures is expected to be high; the measures would protect documented populations of green bug-on-a-stick moss (*Buxbaumia viridis*) and deerfern (*Blechnum spicant*). The above measures would also assure protection of any newly documented occurrences.

Wildlife Habitat - Legal and biological requirements for the conservation of Threatened, Endangered, and Sensitive (TES) species would be met. If any TES species were located during project implementation, management activities would be altered if necessary so that proper protection measures are taken. Timber sale contract clause, Protection of Endangered Species, would be included in the contract. This contract clause would be highly effective in protecting TES species.

Wildlife Tree Retention. The following minimum amounts of standing trees would be retained within harvest areas. In harvest areas less than 5 acres in size, surrounding stands of trees may be used to meet retention objectives provided that the minimum amounts of snags and green tree replacements can be met when averaged within a 25 acre zone adjacent to and surrounding the harvest area. Provide equal proportions of

live trees and snags:

Dry Forest: 4 snags and 4 live replacements/acre from the largest dbh size class.
Moist Forest: 6 snags and 6 live replacements/acre from the largest dbh size class.

Selection of snags and live tree replacements would emphasis practices which assure the highest probability for long-term retention (Bull, et al. 1997). The higher hazard, higher failure probability snags (advanced decay) would not be used to meet retention objectives. Large diameter snags (greater than 15 inches diameter) that are felled for safety reasons would remain on site to provide for wildlife habitat and long-term site productivity. Minimum height for snags designated for retention would be 40 feet.

Retention practices should focus on ponderosa pine, western larch and recently dead or dying Douglas-fir. Snags should be provided on every 5 to 25 acre area, in clusters or patches, where feasible. It is also desirable to leave live tree replacements in the same patches.

Logs: Coarse woody debris is important to a wide variety of wildlife species, it is also essential for soil productivity, and supplies food and habitat to a large number of invertebrates and microorganisms. The following minimum amounts of logs should be retained within harvest areas. In areas where these numbers are not attainable, provide amounts as close as possible to those listed. It is not the intent of this direction to require felling of snags or live trees to meet this requirement.

Dry Forest: 3-6 logs/acre; each piece 12" or greater in small-end diameter and at least 6 feet in length (20-40 total lineal feet).

Moist Forest: 15-20 logs/acre; each piece 12" or greater in small-end diameter and at least 6 feet in length (100 - 140 lineal feet)

If a goshawk next site were located within the project area the following would occur:

The integrity of any nest sites that lie within the treatment area would be maintained by establishing a 30-acre no-activity buffer around the nest tree.

For nest sites that lie outside treatment areas within a disturbance risk area, purchaser's operations and related activities would be suspended within one-quarter mile (approximately 400 meters) of known nest sites during March 15 - August 15 to reduce risk of nest abandonment caused by disturbance. Activity restrictions can be removed after June 30 if nest site is determined to be inactive or unsuccessful.

Flammulated Owl: Habitat manipulation within flammulated owl habitat would be designed to achieve conditions which would provide for both the short-term and long-term benefit of this species. If nest trees are found a minimum 200 foot buffer would be provided. Because this feature would be specified in the contract, it would have a

moderate to high effectiveness in maintaining coarse woody debris.

4. *Improvement Opportunities*

The following are projects that could improve resource conditions within the project area. These projects are not mandatory for project implementation nor is there a guarantee for implementation; they may be accomplished if funding becomes available. The anticipated effects of implementing these activities are discussed by resource in Chapter 3.

During field reviews of the project area, an undersized culvert was identified in Canyon Creek on Road 597G. During very high flows, the creek backs up and flows over the road surface. In addition, the culvert acts as a fish barrier to fish passage during high flows. By replacing this undersized pipe, there is an opportunity to decrease the risk that a road failure would lead to sedimentation of the creek. In addition, the fish blockage could be removed. The funding to replace this pipe is not bet identified yet but it would likely come from appropriated or grant funds. Please refer to the project file for additional notes on this site.

In addition to the noxious weed mitigation measures that are identified above, other monitoring and treatment of weeds may occur in the project area if funding is available. The full extent of surveying, monitoring and treatment and the availability of funding (KV or appropriated) is not known at this time, therefore these activities are identified as opportunities that could be accomplished if funding became available. Treatment would be conducted under the guidelines of the Priest Lake Noxious Weed Environmental Impact Statement and Record of Decision (USDA Forest Service 1997).

5. *Project Monitoring*

The following monitoring would be conducted if the proposed action is selected and implemented. This monitoring is designed to verify that the projects are implemented as designed, and are effective and efficient in meeting project and Forest Plan objectives.

In addition to Forest Plan monitoring (see Forest Plan), monitoring is conducted on projects to ensure that implementation is consistent with established standards and guidelines as well as the design features and mitigations of the specific project. For example, all harvest operations; road construction, reconstruction, and maintenance; fuel reduction piling and burning; and planting would be monitored by Forest Service representatives to ensure compliance with contract specifications in addition to implementation of any resource improvement project included in the project. This monitoring is documented on contract inspection reports.

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. This steady informal communication

allows for incremental adjustments throughout layout and project implementation to achieve the desired results. In addition to these less formal monitoring procedures, the following monitoring items would be conducted:

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

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

Vegetation: All regeneration-cutting units would be monitored for regeneration success. This is a requirement of the National Forests Management Act. Each active harvest unit would be visited at a frequency necessary to assure compliance with the contract. Minor contract changes or contract modifications would be enacted, when necessary, to meet objectives and standards on the ground. This monitoring is documented on inspection reports.

Best Management Practices: Best Management Practices (BMPs) would be incorporated into many different phases of the project. The Zone Hydrologist would review the planned design of all temporary roads and all road maintenance to assure compliance with BMPs. The engineering representative and the Zone Hydrologist would monitor all temporary and reconditioned roads to ensure that they were built or restored to specifications.

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

Air Quality: During the burning of timber cutting residues (slash), smoke management guidelines would be followed as prescribed in the Idaho Smoke Management Memorandum of Agreement (1990), and the North Idaho Cooperative Smoke Management Plan (1990). 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 and spring burning seasons and yearlong by the Idaho Department of Environmental Quality.

Visuals: The project would be reviewed before, during and after cutting operations are complete to assess whether visual quality objectives (VQOs) were met.

Decommissioned Roads: Decommissioned roads would be checked periodically during the first year (and periodically thereafter if no problems are noted) to monitor effectiveness of erosion control, noxious weed control, and wildlife security.

Fisheries: Buffer widths for RHCAs in the project area would be monitored prior and during the project to ensure that they are applied. During project activities, the contract administrator would do monitoring of RHCAs.

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

2.4 Comparison of Effects by Alternative

Table 2-3 summarizes information from Chapter 3: Affected Environment and Environmental Consequences, and compares the environmental effects of alternatives.

Table 2-3: Comparison of Alternatives

Issue #1: Effects to water quality and fish habitat	**Current Condition** (as influenced by past and ongoing activities on all ownerships)	**Alternative 1** (as influenced by past, ongoing, and foreseeable future activities on all ownerships)	**Alternative 2** (as influenced by past, ongoing, proposed, and foreseeable future activities on all ownerships)
Indicator: Risk of Stream Crossing Failure	Risk is rated as moderate because approximately one-third of the pipes within the roads that are proposed for use with this project are considered at risk for failure	Current risk of culvert failure would not be lessened. The risk for stream crossing failure would reach a high level within the next 5 to 10 years.	The risk of stream crossing failure would be reduced from "moderate" to "low-moderate". Fourteen culverts would be removed in roads that would either be decommissioned or put into storage. On roads that would be left open, one pipe would be enlarged and 4 damaged pipes would be replaced. In addition, if funding becomes available, an additional pipe would be enlarged to both reduce the risk of failure as well as eliminate an existing fish blockage.
Indicator: Sediment Production and Delivery	There is a moderate amount of sediment that is being generated and delivered to the streams. This condition has been created because of the relatively high density of existing roads and poor funding for maintenance. However, to date, water quality and fisheries have not been adversely affected from sediment inputs.	Roads would continue to supply a moderate amount of sediment to the streams. Unless road maintenance funding was increased and improvement projects initiated, sediment production and delivery would gradually increase to a high level in 10-20 years and water quality and fish habitats would begin to degrade.	Sediment yield would increase by twelve percent in the short term as a result of the proposed roadwork. Replacing/removing culverts, improving ditches and grading road prisms would cause this increase. However, this increase would be short-lived and the road improvements would result in a long-term decrease in sediment input into streams. The proposed vegetative treatments would cause an additional seven percent increase in sediment as a result of the decreased canopy cover.
Indicator: Water yield increases	Peak water yields are well within their natural range and are only slightly higher than those that would occur if there were no canopy openings in the drainage.	Peak water yields would remain at current levels for 10 to 20 years. Peak flows would then gradually decrease as canopy openings created from past management continue to close.	The proposed vegetative treatments could reduce canopy densities and peak stream flows in the Canyon Creek drainage would increase 4% beyond existing levels for two years, and then diminish. Smaller increases would occur for the "Face" drainages.
Summary	Streams within the analysis area have good water quality and fish habitat.	Sediment inputs into the streams would increase in the future and the risk of stream crossing failures would rise. Water quality and fish habitat would slowly degrade and Forest Plan direction regarding these resources would not be met.	Overall there would be a net improvement to water quality and fish habitat due to the road improvements (e.g. surface gravelling, upsizing culverts) and the removal of some roads that could fail. Forest plan direction for these resources would be better met with this alternative than with Alternative 1.

Issue #2 - Effects to wildlife species of Concern	**Current Condition** (as influenced by past and ongoing activities on all ownerships)	**Alternative 1** (as influenced by past, ongoing, and foreseeable future activities on all ownerships)	**Alternative 2** (as influenced by past, ongoing, proposed, and foreseeable future activities on all ownerships)
Northern Goshawk *Indicator*: Effects to suitable/capable habitat	No occurrences of this hawk have been documented in the analysis area. However, suitable habitat exists. 26% of the capable nesting habitat is currently in a suitable condition.	No change from the current condition. As compared to Alternative 2, this alternative would not reduce suitable habitat.	Vegetation treatments would reduce suitable nesting habitat to 24%. However, this reduction is not significant as numerous suitable nest sites and alternative sites would still be available.
Flammulated Owl and White headed woodpecker *Indicator:* Effects to suitable/capable habitat	No occurrences of these species have been documented in the analysis area. However, suitable habitat exists. Six percent of the capable habitat is currently in a suitable condition.	In the short term, no change from current condition. However, over the next 10-20 years, suitable habitat would continue to decrease as timber stands become too dense.	Vegetation treatments would increase suitable habitat to 8% by thinning timber stands that are currently too dense. However, because this increase is small, there would not be a substantial benefit to these species.
Black backed and Pileated Woodpecker *Indicator:* Changes in the amount and quality of suitable snag habitat.	No occurrences of these species have been documented in the analysis area. However, suitable habitat exists. Approximately 80% of the analysis area is in a suitable habitat condition.	No change from the current condition. As compared to Alternative 2, habitat would not be improved on 25 acres.	80% of the analysis area would still remain in a suitable condition but the quality of habitat on 25 acres would be improved (especially for the black backed woodpecker). This improvement would occur as a result of creating good snag habitat in Unit #6. However, because habitat would be improved in a relatively small area, this beneficial affect would not be significant.
Fisher and Marten *Indicators:* Effects to suitable and capable habitat, habitat connectivity and human activities and access	No occurrences of these species have been documented in the analysis area. However, suitable habitat exists. 46% of the capable habitat is currently in a suitable condition. Habitat continuity is high, access is high and human disturbance is low-moderate.	No change from the current condition on any of the indicators. Compared to Alternative 2, this alternative would not reduce habitat suitability or continuity, and would not increase human disturbance in the area.	Vegetation treatments would decrease habitat suitability to 45%. Habitat continuity would be reduced to high-moderate. Access would remain at a rating of high and human disturbance would increase to moderate. All of these effects are minor and would not significantly affect these species.
Summary	With the exception of flammulated owl and white headed woodpeckers, there is abundant habitat available in the analysis area for these wildlife species. Very little capable habitat is currently available to the flammulated owl and white headed woodpeckers because the stands are too dense.	This alternative would not have significant effects on these wildlife species and the alternative would meet Forest Plan objectives, standards and guidelines concerning wildlife.	Small reductions of goshawk, fisher and marten habitat would occur. Habitat for flammulated owl and white headed woodpecker would increase slightly and the quality of a small amount of habitat for black backed and pileated woodpeckers would improve. The effects to these species would not be significant and the Forest Plan objectives, standards and guidelines concerning wildlife would be met.

Issue #3: Effects to sensitive plants and plant species of concern	**Current Condition** (as influenced by past and ongoing activities on all ownerships)	**Alternative 1** (as influenced by past, ongoing, and foreseeable future activities on all ownerships)	**Alternative 2** (as influenced by past, ongoing, proposed, and foreseeable future activities on all ownerships)
Green Bug-On-a-Stick Moss *(Buxbaumia viridis)* *Indicator*: Amount of disturbance to habitat (rotten down wood)	Populations of this sensitive moss were located in several proposed treatment areas. Timber harvesting and road construction activities have impacted this moss and its habitat. However, the analysis area still contains a high percentage of suitable habitat (mature and older timber stands with down rotten wood) that has not been detrimentally impacted.	As compared to the current condition, there would be no additional effects to the moss species from implementing this alternative.	Cumulative impacts to this moss species would be moderate (i.e., individuals and/or habitat may be affected, but populations would not be affected and habitat capability would not be reduced below a level which could support sensitive plant species in the long term). Known populations of the plant would be protected.
Moonworts *(Botrychium species)* ***and other rare plant species*** *Indicator:* Amount of soil and/or canopy disturbance in habitat for Botrychium and other sensitive species associated with moist/wet sites.	There are no documented occurrences of sensitive Moonworts within the project area. However, suitable habitat is present. With the exception of a single deerfern plant, there are no other rare plants associated with moist/wet sites documented in the area. Timber harvesting and road construction activities have probably impacted Moonworts and its habitat. However, the analysis area still contains a high percentage of suitable habitat that has not been detrimentally impacted in the past.	As compared to the current condition, there would be no additional effects to rare Moonworts. Cumulative effects would be low to deerfern and to rare plant species associated with moist/wet habitats.	Impacts to Moonworts would be low (i.e., individuals, populations and/or habitat would not likely be affected) to moderate.
Summary		This alternative would meet Forest Plan direction regarding the management of sensitive and rare plant species.	This alternative would meet Forest Plan direction regarding the management of sensitive and rare plant species.
Issue #4: Effects to soil productivity			
Indicator: Increase in amount of detrimentally disturbed soil	As a result of past activities, an average of 0.7% (2.2 acres) of the proposed treatment areas has been detrimentally disturbed.	This alternative would not detrimentally disturb any additional soil. The amount of detrimentally disturbed soil would remain the same as the current condition.	This alternative would increase the amount of detrimentally disturbed soil as a result of using ground based logging machinery in some of the treatment areas. The alternative would detrimentally disturb an additional 7.0 acres of soil. This would result in an average of 2.8% of the activity units being in a detrimentally disturbed condition
Indicator: Acres harvested on potassium limited soils	Past harvesting or other management activities that could potentially influence potassium levels in these areas was very minor. Therefore, it was assumed that potassium levels were not reduced through past management.	This alternative would not affect the amount of potassium in the soil.	Approximately 141 acres of vegetation treatments would occur on soils that could be limited in potassium.
Summary		Past management activities have had a very small impact on the soils within the proposed treatment areas.	This alternative would be consistent with Forest Plan direction regarding the management of the soil resource. At least 85 percent of the activity areas would be left in an acceptable condition.

Issue #5: Effects on noxious weed invasion and spread	**Current Condition** (as influenced by past and ongoing activities on all ownerships)	**Alternative 1** (as influenced by past, ongoing, and foreseeable future activities on all ownerships)	**Alternative 2** (as influenced by past, ongoing, proposed, and foreseeable future activities on all ownerships)
Indicator: Amount of canopy removal and ground and/or understory vegetation disturbance.	Oxeye daisy, goatweed, spotted knapweed and meadow hawkweed were observed on existing roads within the project area. No noxious weeds were observed in areas proposed for vegetation treatments. Past timber harvesting, road maintenance, road construction/reconstruction, and the general use of the roads were the main factors that caused this situation.	The risk that cumulative actions would cause the spread of existing weeds and/or the establishment of new weeds is low (i.e., existing weed infestations and/or susceptible habitat not likely affected)	The risk that cumulative actions would cause new invaders to become established is low. The risk that existing weed infestations would increase is low to moderate (i.e., existing weed infestations or susceptible habitat affected, with the potential for expansion into uninfested areas).
Summary		This alternative meets Forest Plan direction by not creating disturbances conducive to new noxious weed invasions or spread of existing weed populations.	This alternative provides moderate control actions, as required by the Forest Plan, to prevent new weed species from becoming established, through project design.

Chapter 3: Affected Environment and Environmental Consequences

3.1 Introduction

In this chapter, the affected environment and the environmental consequences are combined and organized by resource. The purpose of this chapter is to describe the resources that are potentially affected by this proposal and to disclose the environmental consequences of implementing the proposed action and the No Action alternative.

3.2 Aquatic Resources

The following section focuses on the existing condition for water quality and fishery resources in the area and what the effects would be from implementing one of the alternatives. As discussed in Chapter 2, three main factors were selected on which to focus the analysis: Risk of Stream Crossing Failure, Sediment Production and Delivery, and Water Yield Increases. All of these items serve as indicators for measuring how the alternatives may impact water quality and fish habitat. Other factors which could potentially affect water quality or fisheries were dropped from further analysis (see Appendix H).

3.21 Regulatory Framework

3.21a Water Quality

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. This objective translates into two fundamental goals:

- Eliminate the discharge of pollutants into the nation's waters; and
- Achieve water quality standards so that water bodies are fishable and swimmable

Through the Clean Water Act, each state is required to provide guidance and direction to protect and restore water bodies. The State of Idaho 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).

Specific references to aquatic resource goals are found on pages II-1 and II-2 of the

Idaho Panhandle National 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 the 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.

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 State of Idaho are responsible for enforcement of these standards. The State's 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 Idaho's 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 State of Idaho 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.

Within the analysis area there are some State and privately managed lands. The Idaho Forest Practices Rules (Title 38, Chapter 13, Idaho Code) addresses timber harvesting, fuel treatments, road construction and road maintenance. The Idaho Department of Lands (IDL) is the agency responsible for enforcement of these regulations on private lands. Activities on National Forest lands are designed to meet or exceed the state guidelines.

Within the State of Idaho, the Department of Environmental Quality (DEQ) has been directed by the United States Environmental Protection Agency (EPA) to improve the aquatic conditions of those streams not supporting beneficial uses. Under the Clean Water Act 303(d) and the US EPA regulation (40 CFR 130.2(J), 130.7), states are given authority to determine which waters do not meet water quality standards or have impaired beneficial uses. Within the analysis area there are three predominant streams that would potentially be affected by proposed activities: 1) Canyon Creek which flows into the Middle Fork, 2) an unnamed first order tributary that flows into the Middle Fork and 3) an unnamed first order tributary that flows into the East River. The East River, which occurs in the analysis area, was identified as a water quality limited segment (WQLS) as defined by the EPA in the “Key” for 1996 and 1998 303(d) Listing for the State of Idaho. The 1998-303(d) list changed the boundaries of East River listing to the North Fork (headwaters to Priest River), retained the North Fork on the list and de-listed the Middle Fork from its headwaters to the confluence with the North Fork. The pollutants of concern for the East River are sediment, dissolved oxygen, temperature and flow. Currently, the TMDL for the East River and its tributaries are at the infant

stage of development. See the project file for documentation of a phone call between DEQ and the USFS that outlines the current status and long-term plans for the TMDL of this river system (Rothrock, May 2001).

Within the cumulative effects analysis area (see project file for map), beneficial uses include domestic water supply, salmonid spawning, coldwater organisms, irrigation, and recreation. See table 3-1 for a brief review of the beneficial uses by watershed. According to the records of the Idaho Department of Water Resources, there are six water claims within the private land located in the lower East River drainage near the project area. Of these six claims, two are for irrigation and four are for domestic water use. The streams within the project area include stream habitat for several species of native fish (see table 3-4). Fishing, swimming and floating are the primary recreational uses of the water. For the purposes of this assessment, beneficial uses that could be affected by the proposed action include coldwater biota and fisheries. Given the scope of the proposed action and the prescribed BMPs, there would be no effects to ground water recharge that could affect the quantity or quality of water available for domestic water users or irrigators. Furthermore, there would be no changes in the scenic quality of the rivers and streams that could adversely affect a recreational experience (project file).

Table 3-1. Beneficial Uses in each drainage

Watershed	Municipal /Domestic Water Supply	Salmonid Spawning	Cold Water Organisms	Irrigation, Livestock Water	Fishing, Boating, Wading
East River	X	X	X	X	X
M.F. East River		X	X	X	X
Canyon Creek		X	X		X

3.21b Fisheries

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

- National Forest Management Act - 1976
- Endangered Species Act
- Executive Order 12962 (Recreational Fishing)
- State of Idaho Governor's Bull Trout Plan

The National Forest Management Act (NFMA 1976) requires that the Forest Service manage for a diversity of fish habitat to support viable fish populations (36CFR219.19). Regulations further state that the effects on these species and the reason for their choice as management indicator species (MIS) be documented (36CFR219.19(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 protections measures. See Appendix H for details.

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.

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 H. Through a process involving state and federal agencies, interested groups and individuals (i.e., Basin Advisory Groups, Watershed Advisory Groups, Technical Advisory Teams), a Problem Assessment was prepared (PBTTAT 1998) and a conservation plan was developed (Resource Planning Unlimited 1999) for the Priest Lake watershed.

3.22 Affected Environment and Existing Conditions

3.22a Past Activities and Events that Influenced the Aquatic Environment

Past Wildfires: Historically, the greatest natural agent of disturbance in the Middle Fork and Canyon Creek drainages was wildfire (Gary Weber, pers. comm.). There has been only limited dendrochronology work completed in the stands of the Experimental Forest and therefore, the fire history data is fairly vague. However, according to a report authored by Wellner in 1951, the stands in the Experimental Forest resulted from mixed severity fires from the 1850s and 1860s. Wellner specifically mentions a relatively large fire in 1857 that "swept across much of Benton Creek and most of Canyon Creek." Those fires had mixed mortality and Wellner specifically reported that in Canyon Creek the fire of 1857 completely skipped the draws and other moist areas. Generally speaking, within the analysis area, the north facing lower elevation stands experienced stand-replacing fires every 100 to 300 years. In the higher elevations on south facing slopes the stand-replacing fires had an interval of every 100 to 150 years (G. Weber, pers. comm.).

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 but these increases probably did not alter channel conditions because of the inherently stable belt rock geology that is present within the area. In addition, fires probably did not burn very severely in the larger riparian zones in the area.

Manipulation of Vegetation: Since the Experimental Forest was established in 1911, researchers have been manipulating and researching the stands within the boundaries of the Experimental Forest. About 20% of the stands have been manipulated since 1930. Most of these past treatments within the Experimental Forest have had minimal crown removal with the exception of Observatory Point. Most of the cuts have been partial cuts or patch cuts of less than 5 acres (Bob Denner, pers. comm.). This level of vegetation manipulation most likely did not influence water yield levels measurably.

Roads: Road construction within the Experimental Forest has been extensive because of the access needs required for long-term research studies. The main roads up the drainages were constructed in the 1920s and 30s, although the majority of the roads were constructed in the 1950s and 1960s. In all of the Experimental Forest, there is approximately 58 miles of road; of these about 18.5 miles are brushed closed. Within the Canyon Creek drainage, there is an estimated 29 miles of road and 13 miles are brushed closed. Of these 29 miles of road, about 5 miles are encroaching within 50 to 75 feet of the stream channels. Roads have been the single greatest impact to stream conditions in Canyon Creek.

Fish Barriers: Waterfalls, channel flow intermittency, high water temperatures, and some debris jams are part of the reference conditions that naturally and continually fragment aquatic habitats for various periods of time. In the project area, waterfalls and long stretches of cascade habitat with no step pools are the predominant form of natural barriers. However, the fact that natural fish populations persist means that they successfully adapted to these conditions over time.

Sediment Production and Delivery: Surface erosion and, to a much lesser extent, mass erosion are part of the natural reference conditions for sediment production and delivery of the streams within the project area. Prior to fire suppression, wildfire frequently altered the structure and composition of forest stands within the assessment 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 hillslope rejuvenation caused by streams reaching a lower base elevation or channel migration, there was no major mechanism such as roads that could cause slope instabilities by undercutting or overburdening slopes.

After reviewing a set of aerial photos from 1935 (photo #52) and comparing to a similar set from 1996 (photo #574), it appears that the mainstem of Canyon Creek has not changed despite the extensive roading upstream. Conversely, the riparian zone for the

lowest reach of Canyon Creek has remained relatively wide and dominated by riparian shrub species (e.g. Alder) that often are associated with channel reaches that are actively adjusting. It appears from the field reviews and aerial photo reviews that the mainstem of Canyon Creek is essentially unchanged over the last 60 years. However, field reviews of the roads and streams in the headwaters suggest that the high road density has increased sediment and water delivery to the smaller headwater streams.

The mainstem of the Middle Fork of the East River has changed markedly between 1935 and 1996. In the 1935 photo, the stream was less sinuous and there were considerably more stands of conifers in close proximity to the stream. The change in the mainstem of the Middle Fork is a function of the historical logging, roading and grazing that has occurred within the riparian zone in the lower elevations as well as the extensive roading and logging that occurred in the headwaters of the basin.

Water Yield Increases: 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. In the Canyon and Middle Fork drainages, the percentage of the drainage within this elevation range that is most prone to rain-on-snow events is 51% and 40%, respectively. While a large percentage of these drainages are located in that elevational band their position at higher latitudes moderates their sensitivity to rain-on-snow events. The following paragraph describing past water yield studies 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 significant channel forming events. The spring rains falling in the basin are the stimulus for the peak spring runoff. A study by Haupt (1968) concluded that spring peak flows in Benton Creek were linked more often to meteorological events (e.g. rain-on-snow) than to clear weather snowmelt.

Water yield within the two drainages is dominated by spring runoffs. Hydrograph data gathered from the Benton Dam within the Experimental Forest since 1938 supports this assessment (Haupt 1968). Peak stream runoffs tend to occur in April and May and in fact 2/3^{rds} 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, to recede in January, to 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, and in other years there were two winter peaks. The current water yield within the two basins is likely higher than it would be historically because of the high density of roads.

Fish habitat in the cumulative effects 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 can play a

large role in determining habitat conditions in fish-bearing streams. Within the analysis area, streams that are historic bull trout habitat and are known or presumed to be fish-bearing (table 3-4) are discussed in detail in this analysis.

Physical attributes of fish habitat are mainly defined by stream channel condition. The bedrock-controlled nature of the middle and upper headwater Canyon Creek channels have made them resilient to natural and human-caused disturbances over time. As a result, habitat degradation in these streams is relatively minor.

The historic distribution of bull trout in the Middle Fork East River watershed is unknown. Their current distribution is limited to the upper tributaries Middle Fork East River. It is possible that more habitat was historically available to bull trout than is currently known.

3.22b Methodology Used for Describing the Existing Condition

Information for the watershed and fisheries analysis relied upon data from field surveys, district fish/hydrology files, historical records, aerial photographs, Geographic Information Systems (GIS) analysis, published scientific literature (see references list), the Priest Lake 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). The U.S. Fish and Wildlife Service (USFWS) provided electrofishing/stocking data and comprehensive knowledge of the fisheries resources in the East and Middle Fork East River watershed. All supporting information can be found in the project file.

Analysis Area: Within the analysis area, there are three drainages that will be addressed in this aquatic report: 1) Canyon Creek, 2) Middle Fork East River and 3) East River. For the purposes of this analysis, Canyon Creek will be referred to as Canyon Creek, but the other two drainages will be referred to as one unit called the "Face". The "Face" portion of the project area includes two small perennial streams, one flowing into the Middle Fork of East River and the other flowing into the mainstem of East River.

Field Reviews: All roads and streams within the project area were surveyed during the 1999, 2000, and 2001 field season. Roads within the project area were surveyed between 1999 and 2000. 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).

A modified version of the R1/R4 fish and fish habitat inventory (Overton et al 1997) was conducted within Canyon Creek during the 2000 field season (see project file for variables collected and summarized). Additional stream information was collected to determine stream channel types, cross sectional profiles, woody debris composition and stream temperature. Also, in 2000 and 2001 field seasons, snorkeling was conducted to determine presence/absence of fish species in the watershed. Existing and potential in-channel and stream-bank erosion sites were also documented with this survey.

Aerial Photos: Aerial photos from 1935 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 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 Canyon Creek drainage were estimated from the methods documented in the R1/R4 Sediment Guides (USDA Forest Service 1981) and the WATBAL Technical User Guide (Patten 1989). The version calibrated for the Idaho Panhandle National Forests, known as WATSED, is an analysis tool that spatially and temporally organizes typical watershed response relationships as a result of forest practices. The estimated responses are combined with other sources of information and analyses to help determine the findings of probable effects.

WATSED estimates a series of anticipated annual values over a period of years. The model predicts an estimate of 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 2002, which is prior to any anticipated disturbances related to the proposed activities.

The estimates of sediment and peak flow reflect how watersheds with similar conditions and landtypes have responded over time to a similar history of disturbance. WATSED is not intended nor designed to model event-based processes and functions, or specific in-channel responses. It does, however, incorporate the results of those processes in the calibration of its driving coefficients. WATSED does not evaluate increases in sediment and peak flows specifically resulting from "rain-on-snow" events or other stochastic events, nor does it attempt to estimate in-channel and stream-bank erosion. 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 vegetative 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 Forest Service, 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 organize the evaluation according to rule sets established by the author and cooperators. In the case of WATSED, the rule sets reflect watershed processes and functions based on research, data, and analyses collected locally and regionally. Forest Plan monitoring reports (USDA Forest Service 2000, 1999, and 1998) describe how the calibration and validation of WATSED has been an annual process on the forest and where changes have been made. 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 a knowledge of the model and its limitations, other models, data, analysis, experience and judgment must integrate all those sources to make the appropriate findings and conclusions. Recent validation of WATSED runs indicated that the WATSED measured responses were accurate for flow, but appeared to overestimate sediment loads (USDA Forest Service 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).

The WATSED model was not used for the cumulative analysis of the "Face" drainages. The WATSED model is not suitable for use on subdrainages as small as the two perennial drainages that drain the "Face" (Rick Patten, IPNF-Forest Hydrologist; personal communication).

3.22c Watershed Characterization

Figure 3-1 displays the streams within the assessment area.

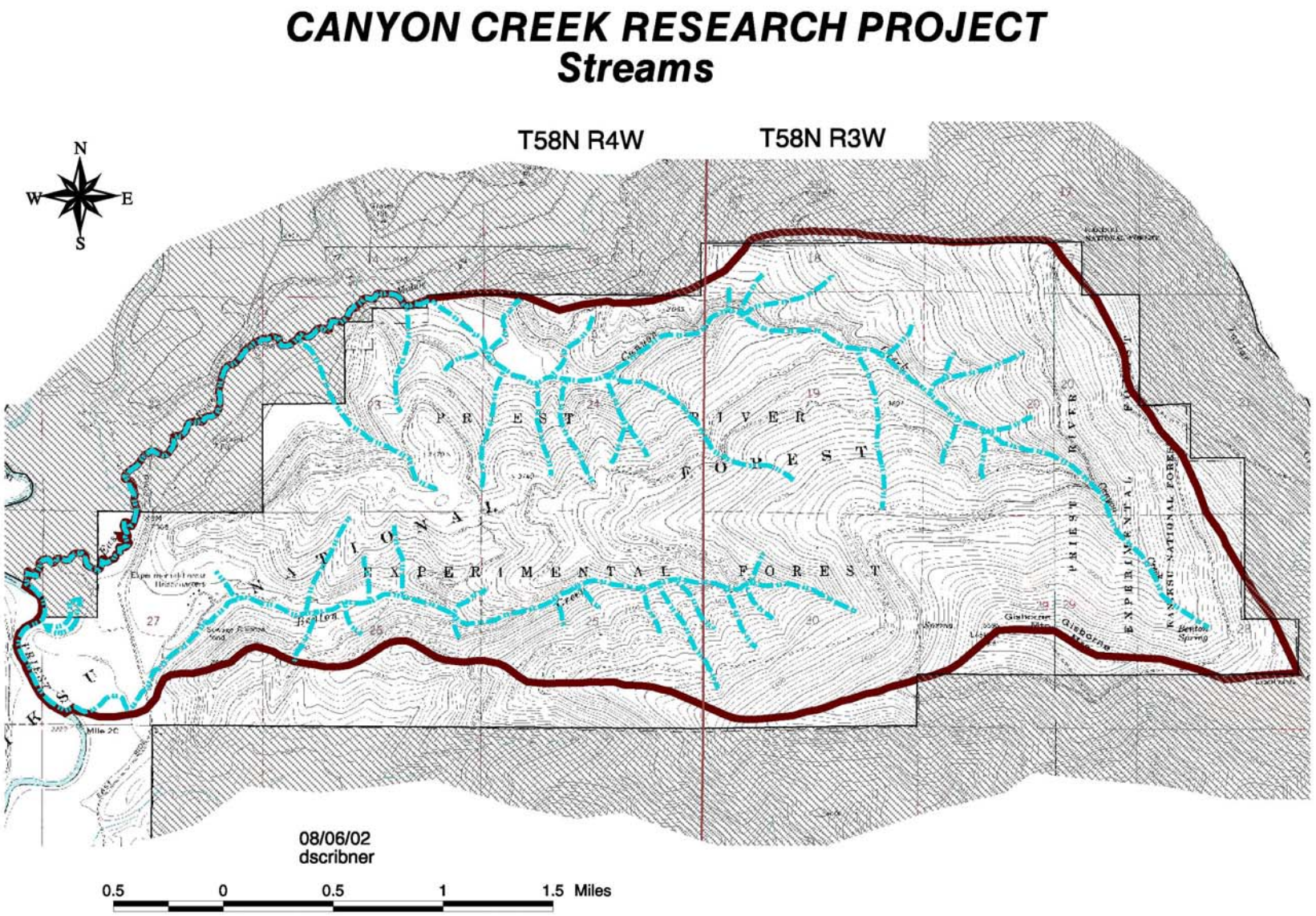

Figure 3-1. Map of the streams.

East River: The East River drainage includes 43,165 acres and is predominantly managed by the Idaho Department of Lands. Two major tributaries within the East River are the Middle Fork and the North Fork, draining about 22,000 and 19,500 acres, respectfully. As the confluence of the North and Middle Fork, the mainstem of East River, flows 2.5 miles down to the confluence with the Priest River.

Middle Fork of the East River: This stream originates on the Selkirk Crest and includes approximately 22,000 acres. Elevations within the basin range from 6,300 feet on Mt. Casey to 2,280 feet near the confluence with the North Fork of the East River. The average annual precipitation for this drainage ranges from 40 to 50 inches in the higher elevations and 32 to 34 inches in the lowest elevations. The precipitation is mostly snow, and stream runoff peaks are dominated by spring snowmelt (Rothrock 2001). The headwaters of the drainage are underlain with granitic batholith and further down the drainage, there is a wide swath of belt rock. The valley bottoms are a mix of glacial till, outwash and alluvial deposits.

The road densities within the M.F. East River are approximately 5.3 mi/mile^2. This includes some roads that have been decommissioned. Open road density in this basin is about 3.2 mi/mile^2. Approximately 80 to 85% of the Middle Fork drainage is managed by the Idaho Department of Lands.

Canyon Creek: Canyon Creek drains approximately 2,900 acres. The Forest Service manages most of the lands within the drainage; a small portion (< 2 %) of watershed is managed by the Idaho Department of Lands and private landowners. At the point where Canyon Creek joins the M.F. East River, Canyon Creek accounts for less than 6.7% percent of the drainage area of the East River drainage. The mean annual precipitation within the basin is about 33 inches and the majority of the precipitation is snow. The peak stream runoff events are associated with spring melt that occurs from April through May. The summer base flows in Canyon Creek are almost entirely derived by depleting the groundwater reserves (Stage 1957).

The road density within the Canyon Creek drainage is relatively high at 6.5 mi/mile^2 , especially in comparison to the entire Priest River Basin that has an average road density of 3.8 mi/mile^2 (IPNF Geographical Assessment 7/18/02) Not all of the roads in the Canyon Creek drainage are drivable and most are closed with brush. Historically, approximately 17% of the drainage has been harvested, though currently about 11% of the drainage is in Equivalent Clearcut Acres (ECAs).

Influence of Geology and Soils on Hydrology: The underlying geology of much of the East River drainage is granitic batholith, although there is a swath of belt rock underlying the lower one-third of the Middle and North Forks. The dominant geology within the Canyon Creek drainage is belt rocks. The lower most stream valley of the Middle Fork, the lower one half of the North Fork stream valley, and the mainstem is glacial till, outwash and alluvial deposits. The majority of the soils within the East River drainage are a 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.

In the Canyon Creek drainage, the majority of the soils are derived from the hard metasedimentary belt rocks and these soils have relatively high permeability (USDA Forest Ecological Unit Inventory: Kaniksu National Forest 1992). The dominant soils have a silt loam surface layer 14 to 22 inches thick. Based on the hydrologist's experience at the Priest Lake District, streams dominated by belt rock tend to be more resilient to disturbance.

There are specific areas within the basin where there is a moderate risk for mass failures and delivery of sediment to the creeks. Figures 3-2 and 3-3 show maps of the mass failure potential and the sediment delivery potential for the lands within the boundaries of the cumulative effects analysis area.

3.22d Existing Stream Crossing Risk, Sediment Delivery and Water Yield

Stream Crossing Risks: 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 and 1998). These types of events can scour the receiving channel bed and banks adding to the total sediment delivery. Several crossings in the Canyon Creek drainage are undersized and/or 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. The following table (table 3-2) lists inventoried crossings within the project area.

Table 3-2. Existing Condition for Stream Crossing

Watershed	Total Stream Crossings (number)	Inventoried Live Stream Crossings (number)	Number of damaged or blocked culverts	Inventoried Migration Barriers (number)
Road 597A	15	0	1	0
Road 597A3	2	1	0	0
Road 597C	28	16	12	0
Road 597D	5	2	1	0
Road 597F	0	0	0	0
Road 597G	34	11	14	1
Road 597M2	8	6	4	0
Road 597N7	7	3	3	0
Road 597Q2	8	3	8	0
Road 597Q3	2	2	2	0
Road 597S2	6	4	1	0
Road 597S3	1	1	0	0
Canyon Creek (totals)	116	49	46	1

Almost all of the roads in the Canyon Creek drainage were built or improved between 1910 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 within the Canyon Creek drainage there are mass failures that initiate off of road prisms. Normally these failures are relatively small and are called cut slope failures. 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 1997, when managers discovered a relatively large mass failure on the N7 Road. This failure was triggered by the high spring runoff, which followed the winter of 1996. The failure was about 50 feet wide and ran down about 400 feet into Benton Creek. The cause of this failure was that the culvert had plugged and subsequently blew out the road fill. This scale of failure is unusual in the Experimental Forest and the risk of future mass failures in the area is relatively low given the mass failure ratings in the project area and the lack of activities on those landforms with elevated risks.

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 several undersized and/or plugged culverts within the analysis area. The most significant of these culverts is the main crossing of Canyon Creek on road # 597-G. At this crossing the pipe is undersized almost two-fold for a potential 100-year flood event (see project file for calculations). Currently, the water in the mainstem backs up behind this point and causes the stream to drop its bedload and the excess water flows around the crossing and down an adjacent road before re-entering Canyon Creek. Replacement of this crossing is identified as an opportunity in Chapter 2 of this document.

Sediment Production and Delivery: Sediment production and delivery, as used in this analysis, is related to mass failure potential 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 1998). Surface erosion occurs on most forest roads because the road surfaces, cutslopes, fillslopes and drainage structures are native surface roads that are usually composed of erodible material 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 that are used to minimize sediment production and delivery (Belt et al. 1994).

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. Within the analysis area are lands having many combinations of these characteristics with many different implications for management. If a particular combination is abundant on the Forest and has management interpretations, which are different from the other combinations, it is mapped as a landtype and assigned a unique code. The 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 may not necessarily happen. Instead, the landtypes are used to indicate the areas where more careful planning and use of mitigation measures or restoration will usually be needed to avoid or reduce resource impacts.

Figure 3-2 displays the mass failure potential ratings within the cumulative effects areas

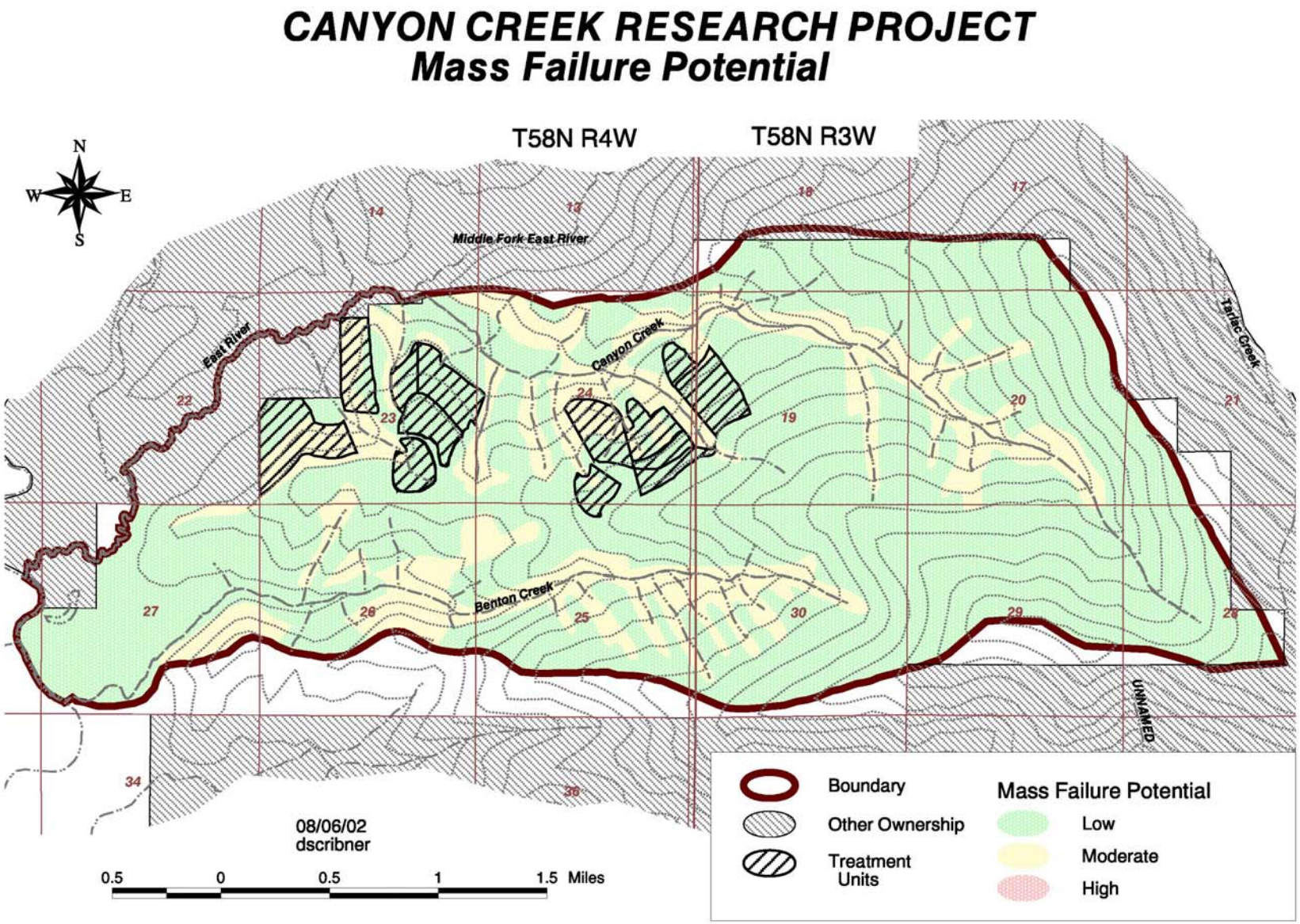

Figure 3-2. Map of mass failure potential.

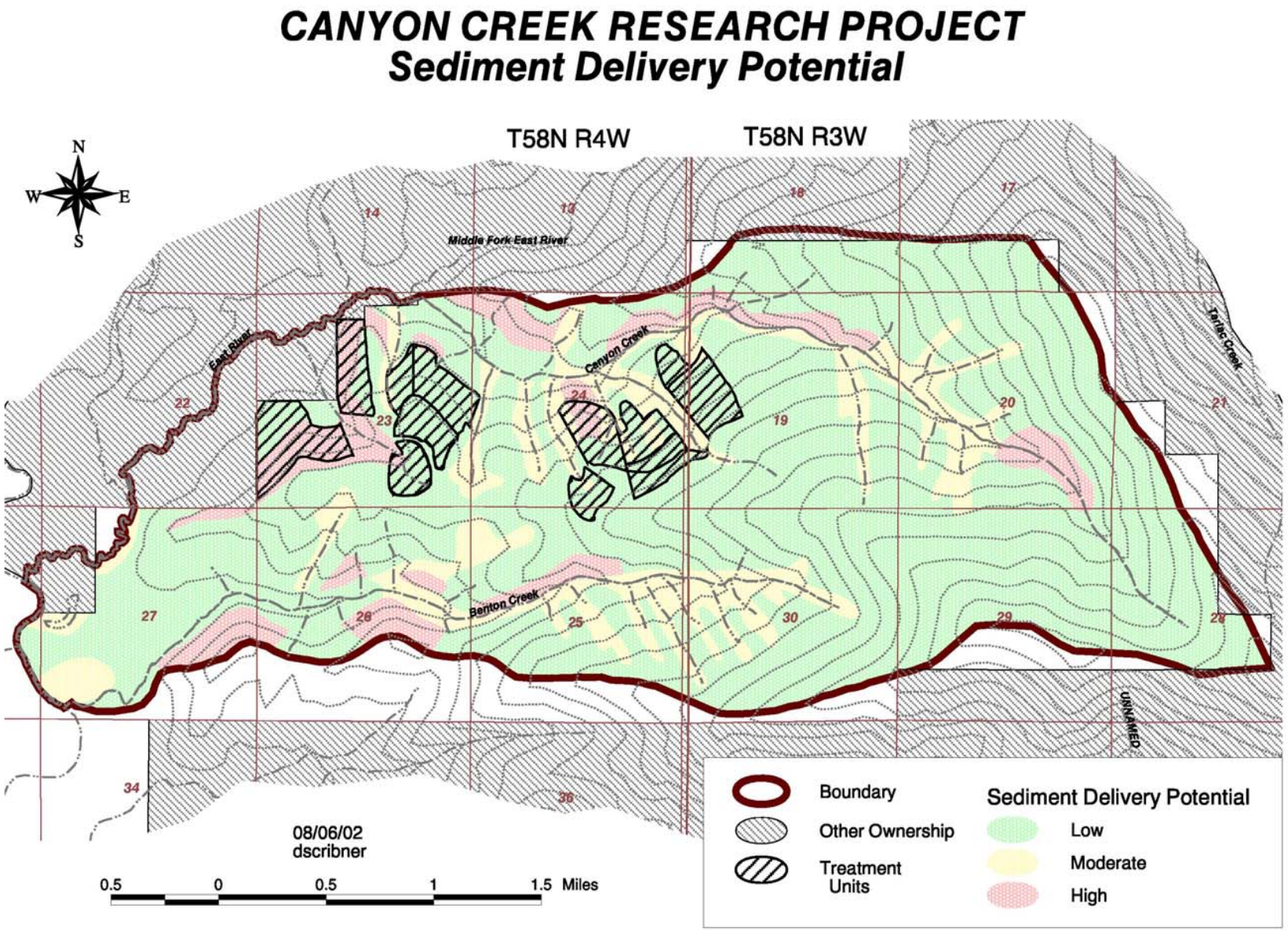

Figure 3-3. Map of sediment delivery potential.

using these landtypes. Figure 3-3 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 the effects 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 following table.

Table 3-3: Existing Risk for Sediment Production and Delivery Indicators and Baseline versus Existing Conditions

Watershed	Percent of proposed treatment areas on moderate Mass Failure Potential	Percent of Analysis Area with Moderate to High Mass Failure Potential	Percent of proposed treatment areas on moderate to high Sediment Delivery Potential	Percent of Analysis Area with Moderate to High Sediment Delivery Potential	Miles of Road on Landtypes with Moderate MFP and Moderate or High SDP	Baseline Sediment Yield (Tons/mi2/year)	Current Sediment Yield (Tons/mi2/year)	Current Percent above baseline for Peak Water Yield (Cubic Feet/Year)
Middle Fork East River Face	53%	18%	53%	49%	0.6	Not Available	Not Available	Not Available
Canyon Creek	22%	21%	23%	21%	6.6	12	28.57	4%

While interpreting the sediment yield increase above natural, it is important to consider that WATSED assumes that a road prism stays open and maintained for 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 estimates.

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 Canyon Creek 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 1966, 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 1998, Megahan 1985, Ketcheson and Megahan 1996).

In the analysis area, the field survey data (stream and road surveys in project file) coupled with the 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 are 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 road to pass the water or bedload. Though no major road failures have occurred within the analysis area, there is the potential for this type of failure to occur given the current conditions of the roads, ditchlines and culverts.

3.22e Fisheries

The cumulative effects areas contain approximately 4-miles of a fish-bearing stream, which is contained within the Priest River Basin. Fish species that inhabit or potentially inhabit streams in the Priest River Basin include native populations of westslope cutthroat (*Oncorhynchus clarki lewisi*), bull trout (*Salvelinus confluentus*), mountain whitefish (*Prosopium* spp.), northern pike minnow (formerly squawfish; *Ptychocheilus oregonensis*), large-scale sucker (*Catostomus macrocheilus*), sculpin (*Cottus spp*.; primarily slimy sculpin, *C. cognatus*, and torrent sculpin, *C. rhotheus*), and longnose dace (*Rhinichthys cataractae*; Simpson and Wallace 1982; district files).

Introduced fish species include populations of rainbow trout (*O. mykiss*); lake trout (also makinaw; *S. namaycush*); eastern brook trout (*S. fontinalis*); brown trout (*Salmo trutta*), kokanee (*O. nerki);* and redside shiner (*Richardsonius balteatus;* Simpson and Wallace 1982; district files). The creation of hybrid fish between native westslope cutthroat trout and exotic rainbow trout and between native bull trout and exotic brook trout may be present. The distribution of these fish are listed table 3-4.

Table 3-4. Fish presence/absence in watersheds in the cumulative effects area

Species Name	East River	Middle Fork East River	Canyon Creek
Bull Trout – BT	X (FY01)	X (FY01)	X**
Westslope Cutthroat – WCT	X (FY97)	X (FY97)	X (FY00)
Eastern Brook Trout – EBT	X (FY97)	X (FY97)	X (FY00)
Brown Trout	X (FY97)	X (FY97)	X*
Rainbow Trout (Coastal Form) – RBT	X (FY97)		
Kokanee – KOK	X**		
Torrent Sculpin – TS	X*	X*	
Slimy Sculpin – SS	X*	X*	X*
Mountain Whitefish – MWF	X*	X*	
Longnose Dace – LND	X (FY97)	X (FY97)	

X=confirmed presence of species; X*=presence of species not confirmed but is likely; X**=presence of species not confirmed but is likely historic; (FY00 = represents the most recent year the data was collected.

Streams listed in the above table flow into other fish-bearing waterways; specifically, Priest River. Given the scope and ensuing analysis of this project, it was determined that cumulative effects would not be detected in Priest, East, or M.F. East Rivers. Non-fish-bearing perennial and intermittent streams occur within the project area, but are not named on Forest Service topographic maps.

Due to the large number of fish species within the cumulative effects area, analysis of direct, indirect, and cumulative effects to fish will use the concept of management indicator species (MIS). Under this concept, larger groups of organisms or communities are believed to be adequately represented by a subset of the group (Idaho Panhandle National Forest Plan 1987). The Forest Plan (IPNF 1987) identifies westslope cutthroat trout and bull trout as potential MIS for fisheries (Appendix L - Forest Plan). Westslope cutthroat trout and bull trout are native to some streams in the project area (Simpson and Wallace 1982; IDF&G; DEQ; district files). Currently, westslope cutthroat trout are known to utilize streams within the project area for spawning, rearing, and over-wintering. Although bull trout may have been historically present across the project area, they currently occur in the East and M.F. East Rivers. Nonetheless, westslope cutthroat and bull trout have been selected as appropriate MIS for the fisheries analysis of this project. Although both of these fish do not exist in all streams, in general one of the two is found in all large streams. In addition, westslope cutthroat trout and bull trout are likely sensitive indicators for all the cold-water biota within the stream segments (Meehan 1991).

The life history of the torrent sculpin will be included below because the Regional

Forester recognizes them as sensitive and is a cold-water species. Torrent sculpin is likely to be present within the Priest River watershed and it will be covered under the effects to MIS.

White sturgeon, burbot, and interior redband are found only to naturalize in the main stem of the Kootenai River, possibly large tributaries (e.g., Yaak River for sturgeon and burbot) and smaller tributaries (e.g. interior redband trout). Hence these species of fish will be given no further analysis within the context of this document since they do not naturally inhabit the Priest River system or its tributaries.

Bull Trout

Bull trout may be native to all the 6th HUC watersheds within the project area (e.g. M.F. East River). Bull trout are listed as a "threatened" species under the EndangeredSpecies Act (Federal Register, Volume 63, No. 111, June 10, 1998). Currently bull trout are known to inhabit the East and M.F. East Rivers within the cumulative effects area. Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics including: water temperature, stream size, substrate composition, cover and hydraulic complexity have been associated with distribution and abundance (Dambacher et al. - in press; Jakober 1995; Rieman and McIntyre 1993).

Stream temperature (below 15°C; 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°C (ranging from 3 to 6 degrees Centigrade) and should equate to ground water temperatures of about 5 to 10 degrees Centigrade (Meisner 1990; Gamett 2002).

Stream channel equilibrium (stability) is the balance between sediment yield, water yield, and channel morphology, which exists within a stream system. Studies indicate that shifts away from channel equilibrium can result in negative changes in the structure and function of stream ecosystems (Bilby and Likens 1980, Schlosser 1982) and their dependent fish populations. Bisson and Sedell (1982) reported that where stream channels became destabilized, riffles elongated and in many cases extended through former pool locations resulting in loss of pool volume. They suggested that declines in older fish might be the result of their dependency upon deeper water habitats. The persistence of bull trout over time can best be provided by maintaining lateral and instream habitat complexity in association with channel stability (Karr and Freemark 1983, Karr and Dudley 1981, Gorman and Karr 1978).

The Priest River is classified as a Category III (Lee et al. 1997) watershed with subwatersheds that support key salmonid species or other aquatic values. Lee et al. (1997) classified each subwatershed into four classes. Canyon Creek has been classified as “Type 3” where the biological significance and salmonid population status were deemed ‘moderate,’ meaning that the potential for adfluvial/fluvial bull trout

recovery is unlikely in the short-term. In a status review of bull trout on the Idaho Panhandle National Forests, stocks from the Priest River watershed were considered to be at moderate risk of extinction (Cross 1992). Genetic analysis has shown that bull trout within many sub-basins of northern Idaho may be unique stocks (B. Rieman, Forest Service Research, personal communication), but they are closely linked to the upper Columbia River populations - one of three major groupings of bull trout throughout the Columbia and Klamath River drainages (Williams, unpublished).

The East River and the M.F. East River (Table 3-4) are likely the most important to species persistence for bull trout within the cumulative effects areas because they are the only streams in the project area bull trout are currently known to inhabit. These large systems have fair habitat conditions and connectivity to Priest River, which is especially important to fluvial/adfluvial bull trout. The following paragraphs focus on conditions in the Canyon Creek watershed (the cumulative effects area for the watershed and fisheries analysis). This lays the foundation to help understand the cumulative effects to bull trout in later discussions. Roads, past timber harvest, and accidental or illegal fish harvest are additional continuing threats to bull trout in the M.F. East River. Road-related effects are described under Watershed Existing Condition. Other, relatively minor threats to bull trout in the East River watershed include past severe wildfires (streams are still recovering) and urbanization (residential home sites along lower Middle Fork East River). Despite rather widespread past disturbances and continuing detrimental effects on the watershed, bull trout continue to successfully spawn in the headwater tributaries in the M.F. East River.

Westslope Cutthroat Trout

Westslope cutthroat trout are listed as "sensitive" by the Northern Region 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; 02/01/02 letter, FWS 1-9-02-SP-213) and is under review for listing under the ESA.

Their preferred habitat is cold, clear streams with rocky, silt-free riffles for spawning and slow, deep pools for feeding, resting, and over-wintering (Reel 1989). Pools are a particularly important habitat component as westslope cutthroat trout occupy pool habitat more than 70% of the time (Mesa 1991). Other key features of westslope cutthroat habitat are large woody debris (LWD) for persistent cover and habitat diversity as well as small headwater streams for spawning and early life-stage rearing.

Adfluvial, fluvial and/or resident life history strategies of westslope cutthroat trout are currently present in watersheds within the project area (Table 3-4). Resident populations remain in river tributaries throughout their life. Certain life histories (i.e. fluvial and adfluvial fish) use river tributaries for early rearing and spring spawning as adults but typically out-migrate to river (fluvial) or lake (adfluvial) habitat as they mature. In the fall, fish that have not previously returned to river and lake areas migrate to

deeper water where they congregate and over-winter (Bjornn 1975). Streams within the project area are utilized by westslope cutthroat trout representing resident life history strategies during various phases of their life cycle.

A population status review of westslope cutthroat trout in Idaho has determined that populations in northern Idaho have declined over their historic distribution with viable populations existing in only 36% of their original range. The primary cause of the decline was found to be habitat degradation (Rieman and Apperson 1989).

Westslope cutthroat trout have been affected by the presence of introduced brook trout. Brook trout out-compete westslope cutthroat trout in areas where habitat is degraded. There is no data to support when eastern brook trout were introduced or stocked into Canyon Creek, but survey data (USFS crews 2000 and 2001) identified their presence. There are no known barriers in the Middle Fork East River or Canyon Creek (except at high flows at the road 597-G culvert crossing) that would prevent access. The associated introduction of non-native fish and tributary habitat degradation to the Priest River basin may have accelerated the decline of potential westslope cutthroat populations in various watersheds. All the streams being analyzed in the project area are known to contain westslope cutthroat trout. And all basins are also known to have eastern brook trout populations (Table 3-4), in which eastern brook and westslope cutthroat trout distributions overlap. Consequently, within the cumulative effects areas, Canyon Creek and the M.F. East River are likely the most important to species persistence for westslope cutthroat trout. In addition to these streams, the connectivity between stream habitat and the Priest River habitat is important to westslope cutthroat trout habitat exhibiting a fluvial/adfluvial life history.

Torrent Sculpin

Torrent Sculpin were added to the Idaho Panhandle's sensitive species list March 12, 1999. This species is not known to inhabit drainages to the Priest River Basin, but data on distribution by streams is limited (Simpson and Wallace 1982; Scott and Crossman 1973). They prefer riffle habitat in medium to wide streams and rivers (Markle et al. 1996). However, large adults (>150 mm) are found in pools. Spawning usually occurs in May and June and occurs in riffles with moderate to high flows. Similar to westslope cutthroat and bull trout, the torrent sculpin is also a cold-water species and generally its range overlaps with both these species. Because this species primarily inhabits large streams, it would only be affected by this project if the magnitude of the effects altered habitat conditions in the larger basins.

East and M.F. East Rivers (Priest River Tributaries): The East River watershed area includes a diverse fisheries, however the East River itself is only 2.5 miles in length before entering Priest River, its primary drainage networks include the North and Middle Fork watersheds (for drainage descriptions see section titled “Stream Conditions”). Fish surveys in the East and M.F. East rivers were conducted by the DEQ (BURP Studies 1997 and 1998) and IDF&G (Horner et al. 1987). Collectively these surveys show that westslope cutthroat density ranged from low to absent in lower sample reaches to good

to abundant in middle and upper reaches. Bull trout densities indicated that their presence was mostly low throughout the M.F. East River mainstem, but adequate in a couple of its tributaries (Rothrock 2001). The M.F. East River and its tributaries support a bull trout population; spawning and rearing habitat has been identified and the Priest River watershed is considered of high importance to bull trout recovery (Panhandle Basin Bull Trout TAT, Draft 1998).

Both eastern brook trout and brown trout densities were identified in the mainstem, and presence in tributaries was site specific. However, brook trout density dominated all other salmonid species in lower reaches. It is unknown if eastern brook trout were stocked in the East River watershed or if they managed to propagate from other plantings within the Priest River basin, but brown trout were most recently planted in the East and M.F. East rivers by the IDF&G in the 1970s and early 1980s (Fish Stocking Database, 2/25/02; www2.state.id.us/fishgame; copies in project file). Other non-salmonid species have been identified within the East River watershed, these include slimy sculpin, unidentified sculpin, and an unidentified sucker (Rothrock 2001; USFS surveys 2000 and 2001; Horner et al. 1987).

The lowest most reaches of the M.F. have been intensively grazed and developed for agricultural purposes by private landowners. Harvest activities on hillslopes and in riparian zones have occurred on federal, state, and private lands (Rothrock 2001). Stream temperatures in the M.F. East River were documented by the DEQ in both 1998 and 1999. Temperature data collected by DEQ in 1998 (Rothrock 2001) indicate that two sites in the East River drainage and a tributary to the M.F. East River exceeded temperature standards for westslope cutthroat spawning and incubation for most days in July (Rothrock 2001). Similarly, EPA bull trout temperature standards were exceeded on most days from July to September (Rothrock 2001). Water temperature can be strongly influenced by land management (Henjum et al. 1994).

Canyon Creek (M.F. East River): Canyon Creek is a third order, spring fed stream with an average annual flow of 10.7 cubic feet/second, with a total length of approximately five map/stream miles. The Canyon Creek watershed encompasses an area of 4.5 mi², with a road density of 6.5 mi/mi², and a stream road encroachment rate of 17%. Approximately 18% of the Canyon Creek drainage has experienced some form of harvest activity, this includes near and in riparian harvests. Several small intermittent and perennial non-fish bearing tributaries feed Canyon Creek for its entire length (see fish buffer map). Stream channel habitat and morphology were evaluated using Level II - R1/R4 (Overton et al. 1997) stream survey methodologies; Rosgen (1996) channel analysis, and the Wolman Pebble Count. The R1/R4 - Level II stream survey protocol is to sub-sample an identified reach and collect important variables (e.g. LWD information; pool, riffle, and run habitat information; pool volume, etc.)

Adfluvial, fluvial, and/or resident forms of bull trout appear to be absent in Canyon Creek watershed. Similar forms are relatively low to adequate in density (Rothrock 2001) in the M.F. East River and tributaries, but habitat connectivity remains available. Historical introductions or stocking of eastern brook trout along with the compounding

effects of natural and human management activities in the East River watershed has combined to alter fish populations and/or spawning and rearing habitat.

Forest Service stream survey crews electrofished Canyon Creek in 2000 and 2001 in order to determine fish presence and absence. They found sculpin, westslope cutthroat trout (2000), and eastern brook trout (see Fisheries project file). A multiple series of steep cascades and a waterfall (26-feet; 90°-angle) approximately one river mile above the road 597-G crossing is a complete block to migratory fish. Above this barrier, electrofishing surveys indicated no presence of fish species. Westslope cutthroat, bull trout, eastern brook trout, and other non-salmonid species and their habitat are affected by the undersized culvert crossing on road 597-G, especially at high flows when it may act as a barrier to upstream migrants into Canyon Creek.

Re-establishment of healthy bull trout and westslope cutthroat trout populations in Canyon Creek is dependent on three major factors: 1) strength of the East and M.F. East River populations; 2) removal of competing non-natives fisheries; 3) trends in spawning, rearing and habitat recovery; and 4) straying of bull trout from the M.F. East River into Canyon Creek that would establish a population there.

Reach Summary

Canyon Creek stream surveys identified three stream reaches. The summary of what was found is included here; see project file for detailed stream reach reports. Overall, Canyon Creek has a high pool to riffle ratio (2:1) and most (64.5 %) pools have large woody debris (LWD) as a primary creator. Stream reach surveys indicated that single pieces of LWD exceeded 70 pieces/100 m of stream surveyed and that aggregates (sampled separately) had on average 15-pieces each and three per stream reach surveyed. Blow-down and root rot pockets have contributed substantially to the in-channel LWD recruitment. As mentioned above, a waterfall barrier exists at the top of Reach 2. Also, during the survey in 2000, there were 16 hand-held thermometer temperatures taken (mostly in September); none exceeded 10°C.

In review of the Canyon Creek survey data the summary reach information collected indicates that the channel is in relatively stable equilibrium. The only exception is the upstream and downstream locations associated with the road crossings. The undersized culvert on the 597-G crossing acts as an artificial nick point, creating upstream and downstream inchannel habitat aggradation and degradation.

3.23 Environmental Consequences

The following is a discussion of the direct, indirect, and cumulative effects of the proposed and reasonably foreseeable activities on the aquatic resources. The discussion of effects is based on the principle issues and indicators identified in Chapter 2. The reasonably foreseeable activities are also listed in Chapter 2 of this document and those relevant to the aquatics analysis are thoroughly discussed later in this section.

3.23a Methodology For Effects Analysis

Direct effects are those that are immediately detected either in time or space as a result of the proposed activities. An example of a direct effect would be an immediate delivery of sediment to a creek. Indirect effects are those that are detected either at a later time or place and occur separate from the actual activities. An example of an indirect effect would be an increase in water yield as a result of removing canopy closure. The direct and indirect effects analyses are combined in this document.

Cumulative effects are based on the existing condition, the direct and indirect effects of the proposed activities and any reasonably foreseeable actions. The reference condition of the cumulative effects analysis is presented in the Existing Condition section of this chapter. Reasonably foreseeable activities that would occur in the two cumulative effects analysis areas include ongoing road maintenance and noxious weed treatments on Federal lands and continued grazing and timber harvesting on private lands. Note in Chapter 2 of this document, it is clearly stated that lands managed by the Idaho Department of Lands are not planned for any timber sales in the near future.

For this environmental analysis, the WATSED model was used to compare the cumulative effects of the No Action alternative (Alternative 1) to the Action alternative (Alternative 2). For Alternative 2, the WATSED model applied the specific mitigation measures as described in Appendix G and the features common section in Chapter 2.

3.23b Direct and Indirect Effects

The direct and indirect effects analysis for this project were based on the existing conditions, knowledge of the area, historic data, past research, familiarity with similar past treatments, and monitoring of similar projects.

Alternative 1: Selection of the no action alternative would mean that none of the proposed road storage, road obliteration, road improvement or proposed experimental vegetation treatments would occur. Conditions in Canyon Creek and two perennial non-fish bearing streams that are located in the Face analysis area would remain unchanged in terms of water conditions.

Risk of Stream Crossing Failure: There would still be an elevated risk of failures at stream crossings within the project area. The risk would gradually increase over time. The failure of these crossings would likely happen if a rain-on-snow event were to occur as discussed in the affected environment section. Under this scenario, if a flash flood and/or debris flow is triggered, culvert failures could occur. Water then is either concentrated over the top of road fills or is diverted down the road or ditch and onto hillslopes unaccustomed to concentrated overland flow. For most culverts, the culvert failures would be localized, but in larger perennial streams the effects could reach the mainstem on Canyon Creek. Additional sediment pulses could result in adverse effects to fish populations. If this type of an event were to occur while bull trout eggs or alevins were still in the gravels, they could potentially be entombed by the additional sediment

and suffocate.

Sediment Production and Delivery to Streams: There would still be some delivery of sediment to streams from the channel banks and instream erosion from natural processes. There would not be any detectable changes in the existing level of sediment delivery or movement in the streams.

Water Yield Increases: There would be no change to water yield other than that which already occurs.

Alternative 2:

Risk of Stream Crossing Failure: Four culverts would be replaced with this alternative, one culvert would be upsized, two new culverts would be installed and 14 culverts would be removed. In addition, any of the inventoried damaged or plugged pipes located on the haul routes would be repaired under the timber sale contract. This prescribed amount of improvement would markedly reduce the risk of stream crossing failure. Road improvement work would occur on Roads 597-C, 597-D, 597-G, 597-S2, 597Q2 and 597D1.

Sediment Delivery to Streams: Under this alternative, there would be minor delivery of sediment to the first and second order drainages in both Canyon Creek and the Face analysis area. The limited increases in sediment delivery would result from the proposed roadwork, site burning and from the proposed vegetative treatments. Given that all of the harvest units and landings are outside of the Riparian Habitat Conservation Areas (RHCAs), it is not expected that the harvests would deliver measurable amounts of sediment to the streams because of the distance between the proposed activities and the riparian zones.

Sediment delivered to the streams during roadwork would result from replacing undersized culverts and from removing culverts in roads that are no longer needed for the long-term transportation plan. The sediment generated from the proposed roadwork would not be delivered at one time but rather would gradually be routed down the stream. During high seasonal stream flows, the first and second order tributaries would effectively transport the sediment down the slope. Some of the material would be trapped behind the smaller natural obstructions in the channels, but most of the sediment would be delivered to the lower gradient reaches where it would be deposited onto the floodplains (See Forest Monitoring Report for 2000 and 2001). As the high seasonal stream flows recede, the material would be distributed behind rocks and woody debris and in eddies.

Table 3-5. Proposed vegetation and road treatments under Alternative 2.

Analysis Area	Units	Total Acres within Units	Miles of Road Obliterated	Miles of Road Storage	Miles of Road to be Improved	Number of Pipes to be Pulled	Total Miles of Existing Road
Canyon	4, 5 (portion), 7, 8, 9, 10, 11,12 and 13	235	2.4	1.1	4.6	11 pipes	29.8
Face	1, 2, 3 and 5 (portion)	165	0	1.0	4.8	3 pipes	11.08
Totals		**400**	**2.4**	**2.1**	**9.4**	**14**	**40.9**

Note: Road obliteration and storage projects are scheduled to occur on portions of Roads 597S2, 597S3, 597Q2, 597Q3 and 597D1. Road surface improvements will occur on Roads 597A, 597C, 597D, 597D1, 597G, 597M2, 597Q2, 597Q3 and 597S2. Portions of some of these roads were brushed closed and will be reopened for this sale. The currently brushed closed roads that will be opened under Alternative 2 include roads: 597D1, 597Q2, 597Q3, 597S2 and 597S3. None of the pipes that would be pulled cross fish bearing streams.

In the Canyon Creek analysis area, sediment generated from any of the road crossing removals or upgrades would mostly be deposited in the low gradient reaches of the tributary channels prior to reaching the mainstem of Canyon Creek. Within one or two years of the initial road decommissioning and/or storage work (depending upon weather and stream runoff patterns), the material deposited in the tributary channels would gradually move down to the mainstem channel in Canyon Creek. At this point the sediment would be efficiently routed down the channel and deposited upon the floodplains or behind obstacles. The proposed actions would not cause increased levels of sediment to reach the mainstem of either the Middle Fork or the East River.

Given the amount and location of proposed roadwork within the Face analysis area, there would be no detectable increase in sediment yield to either of the two perennial streams draining the Face drainages. Within five years of completing the storage and/or decommissioning work throughout the project area, it is expected that vegetation would have successfully colonized the exposed soils and the sediment fines would have already been delivered to the streams. This prediction is based upon past monitoring of road decommissioning projects (See Forest Monitoring Report for 2000 and 2001). In the long-term, the proposed road decommissioning and road enhancement projects would provide a net benefit to the streams by reducing the risk of stream crossing failure and by reducing the annual delivery of sediment from existing roads to the streams.

Prescribed burning and grapple piling for fuel reduction would be accomplished in such a way as to minimize adverse impacts to soils. On the south-facing dry units, prescribed burns would only be done in the spring when fuel and soil moisture would not result in a severe burn that could produce hydrophobic soils or damage the duff layer. Fire lines would be frequently waterbarred to prevent erosion and located to prevent delivery of sediment to streams. Units proposed for grapple piling would be

accessed from existing roads, skid trails and fire lines below or within the proposed units. Only areas that could be reasonably accessed would be treated.

Erosion from these treatments is not anticipated. The proposed grapple piles are located on slopes with a low potential for sediment production and delivery with the use of riparian buffers (see Chapter 2) on grapple pile units. The use of prescribed riparian buffers would further protect aquatic resources during burning and grapple piling activities. Unlike other units, the prescribed burning for Unit 6 would occur within the 50-foot riparian zone of the intermittent channel. However, given that the intent is to burn the unit using a low-intensity, well-controlled prescribed fire, it was determined that there would be no adverse impacts to the stream or the riparian management objective. Direct and indirect effects of the proposed action's prescribed burning and grapple piling include a low potential that sediment from fire lines would be delivered to streams.

A possible effect of the proposed vegetation treatments is an increase in sediment delivery to the smaller first order streams. According to the output from the WATSED model the average natural rate of erosion within the Canyon Creek drainage is approximately 12 tons of sediment per square mile/per year. The amount of sediment that could be delivered from a harvest unit is a function of a number of variables. For this analysis, those units that had a greater risk of sediment delivery were those on sensitive landtypes coupled with traditional ground-based tractor logging and/or where large percentages of the units were on more sensitive landtypes. Of the thirteen units proposed under the action alternative, only two units were on highly sensitive landtypes and only one had proposed tractor harvesting on a sensitive landtype.

The two units, each with up to two thirds of the area underlain by moderately sensitive landtypes, are Units 1 and 2. Both of these units drain into the Face drainages of the East and M.F. East Rivers. Though these units do have a considerable portion of treatment on soils that are identified as having high sediment delivery potential (SDP) and high mass failure potential (MFP). The amount of disturbed ground should be minimal and the risk of sediment delivery to the streams would be relatively low based on an analysis of the prescribed treatments, spatial distribution of the activities across the landscape and the underlying soils.

Unit 9 has some tractor yarding on moderately sensitive landtypes. This unit is located midslope within the Canyon Creek drainage. According to the review of the Sediment Delivery Potential Risk and Mass Failure Potential Risk maps, approximately one third of the unit is on moderately sensitive landtypes. According to the project foresters, the more sensitive portions of the unit would be yarded with a skyline system, whereas the low risk soils would be yarded with tractors. Given this information, there is little to no risk that this activity would increase the delivery of sediment (Niehoff 2002).

The gravel pit expansion of .1 acre in size would not increase sediment delivery to either the East River or the Priest River. The gravel pit is an existing use and would be slightly enlarged under the action alternative. The pit is located in an ancient oxbow that was most likely created thousands of years ago by Priest River and is no longer

accessed by the river.

Effects of Sediment 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 important food source for fishes. High amounts of sediment can fill in pools and reduce rearing habitat for juvenile fishes.

Given the higher-gradient channel types present and the considerable large woody debris component found in the watershed (Stream Surveys 2000 – project file), the predicted increase in sediment delivery would likely be transported or stored within the system. During high flows, silts would likely stay suspended, be carried through the system and be deposited in large woody debris sites or off-channel microsites influenced by high flows. Sands and gravels would likely be deposited on gravel bars or other energy-reducing features. The predicted increase in sediment yield is within the historic range; sediment delivery levels have remained relatively stable and would continue to remain above natural conditions in the short term. The increase in sediment may affect individual fish (if present) but is not likely to have an effect on the overall bull trout population in M.F. East River or resident fish populations in Canyon Creek. In the long-term, sediment levels would recover to the existing condition discussed in Chapter 3.

Water Yield Increases: Increases in water yield would be minimal with the proposed vegetation treatments and road prescriptions. The WATSED Model estimates that within the Canyon Creek drainage, proposed activities would increase water yield peaks by an estimated 4% above current levels. The harvest prescriptions alone accounted for most of the estimated peak water yield increases and this is still relatively minimal. Given the resiliency of the drainage and its natural range of variability (discussed below), this level of water yield peak increase would not adversely affect aquatic resources. In the two drainages that are located in the Face drainages, the proposed activities would cause some localized increases in water yield but the effects of the water yield would not be detectable beyond where the streams meet the Middle Fork or the East River.

While the amount of predicted water yield increase would be higher than what is currently moving through the system, it would be within the range of natural variability. According to historical fire records, most of the stands experienced mixed-severity fires every 100 to 150 years (G. Weber, pers. comm.). The large fires of the 1850s and 1860s likely increased water (and sediment delivery) beyond those delivery rates predicted under the action alternative (Minshall and Brock 1991, Minshall et al. 1989, Anderson 1976).

Effects of Water Yield Increases on Fisheries: For Canyon Creek the increases in water yield would be minimal with the proposed vegetation treatments and road prescriptions. Within the Canyon Creek drainage, proposed activities would increase

water yield peaks by an estimated 4% above current levels. The alternative would initiate a small increase in flows within the first order, headwater drainages, but any effects are expected to be localized. Increases in water yield under this alternative would probably not be detectable in the main Canyon Creek channel.

Since any change in water yield associated with this project probably could not be differentiated from normal climatic fluctuations in either the East or M.F. East Rivers, any additional bedload scour during high flows would not be expected. Redds existing in the cumulative effects area would not be affected by the expected increase in water yield.

Opportunities: In addition to the proposed vegetation and road treatments, there are two opportunities that may or may not be accomplished depending upon funding. These two opportunities include:

- Replacement of the existing 4-foot diameter pipe at the Canyon Creek crossing on Road 597-G with a minimum of an eight 8-foot diameter pipe.
- Treatment of noxious weeds throughout the project area.

The replacement of the existing 4-foot pipe on Canyon Creek would improve the existing channel conditions. This effort would remove an existing high-flow fish block, reduce the risk of a stream crossing failure and would eliminate the current upstream and downstream degradation resulting from the undersized culvert. During the actual project work, which includes excavating out the existing pipe and replacing it, some sediment would be delivered to the mainstem of Canyon Creek. Given that BMPs would be in place, it is reasonable to predict that approximately 300 pounds of sediment would be delivered to the stream during the period whereby the old culvert was excavated. Of that approximately 300 pounds, we would probably successfully trap 250 pounds, thus delivering a short-term increase of about 50 pounds of sediment to the crossing at Canyon Creek. Despite the short-term increase in sediment delivery, the replacement of the Canyon Creek culvert would provide a measurable long-term benefit to aquatic resources.

The treatment of noxious weeds would be conducted in compliance with the Priest Lake Noxious Weeds EIS (USDA 1997) and therefore, would not adversely affect water quality. The benefit of treating noxious weeds is that many noxious weeds do not stabilize the soil and thus their presence may actually increase the risk of sediment delivery to the streams. Therefore, treatment of noxious weeds would be a benefit to aquatic resources.

3.23c Cumulative Effects

A cumulative effects watershed (or watershed area) is the logical culmination point of water flow where the effects of the distributed project activities could possibly integrate or synchronize over time and space and be addressed cumulatively in a larger watershed. The cumulative effects analysis areas for this assessment are displayed on

a map in the project file. The analysis includes effects from past, present, and reasonably foreseeable activities. These areas were chosen based on the amount and types of proposed activities planned within these basins or tributaries to them and because they are logical cumulative affects areas as described above.

Typically the physical effects of runoff modifications, sediment loading, and water temperature, if they occur in projects of this scale, are immeasurable and/or not observable at large watershed and sub-basin scales. This results from the inherent variability of watershed processes and because watershed systems are dynamic in nature. The proposed activities have been designed to reduce existing risks to water quality, salmonid spawning and aquatic organisms while minimizing new effects. Thus, no physical response from the Canyon Creek project would extend to or be measurable in the mainstem of the East River or Middle Fork. Table 3-5 summarizes the proposed vegetation and road treatments under Alternative 2. Additional information regarding the individual unit prescriptions is found in Chapter 2 of this document.

The cumulative effects analysis area for this project has two distinctly defined areas. The first area is defined as the Canyon Creek drainage that includes 2,902 acres (4.5 square miles). The second distinctly defined area is referred to as the Face drainages that flow into both the Middle Fork and the East River. The "Face" area includes 838 acres (1.3 square miles) and includes two non-fish bearing perennial streams. One of these streams flows into the Middle Fork of the Priest River and the other flows into the mainstem of the East River. The two small tributaries were combined for the effects analysis because of their relatively small size, similar predicted effects and the geographical proximity to one another.

The defined cumulative effects analysis area was based on an assessment of the proposed actions and the landforms. This defined cumulative effects analysis area is the furthest spatial extent effects would likely be measured as a result of the combination of federal actions with other ownership actions.

The Face Cumulative Effects Analysis Area: The timber management activities proposed within the two first order tributaries that flow from the "Face" are relatively light and the roadwork impacts would be limited to the immediate site. The proposed timber treatments would involve removal of canopy from 15% to 40% and the majority of the yarding methods would consist of skyline yarding and only a very small amount of tractor yarding. The two main access roads in the Face area would be improved through reconditioning. The lower most portion of the Face analysis area is privately owned and managed. Given the proposed level of vegetation treatment and the proposed road improvements, the amount of water and sediment yield that could be generated off of area would be very minimal. The impacts would be so minimal that the effects of the proposed activities on National Forest Land would not be detected beyond the boundary with the private lands. Given that there would be no additional effects from the proposed activities, there would be no additional sediment or water yield added to the existing conditions on the private lands. Therefore, the cumulative effects analysis area for the Face drainage is limited to the private land boundary and there will

be no further analysis of the Middle Fork nor of the East River in terms of cumulative effects.

The Canyon Creek Cumulative Effects Analysis Area: The majority of the proposed timber treatments are located along the north facing slopes of the drainage and none of the units would modify riparian zones. The prescribed experimental treatments are relatively light and have only minimal soil disturbance. The amounts of proposed canopy removal for the units within the Canyon Creek drainage range from 15 to 40% and most of the prescriptions are either free selection or group selection. This type of prescription would result in a mosaic of canopy densities and tree removal would be concentrated in small openings. Within Canyon Creek, several miles of road are identified for reconditioning and others are identified for storage and or obliteration. The proposed vegetation and road treatments coupled with the prescribed BMPs, the stream characteristics (e.g. ample woody debris and sinuous channel) and relatively low predicted increases in water and sediment yields (WATSED results) suggests that no detectable cumulative effects would be measurable in Canyon Creek beyond the confluence with the Middle Fork.

The tools used for the cumulative effects analysis differed between Canyon Creek and the Face. For both cumulative effects areas, the analysis begins with an assessment of existing conditions, then incorporates the potential direct and indirect effects and then the effects of all reasonably foreseeable activities. For the cumulative effects analysis of Canyon Creek, the WATSED model was used as a primary tool to organize the data and compile possible cumulative effects on water and sediment yield. For the Face drainage, the cumulative effects analysis did not use the WATSED model because of inherent limitations of the model for such small sized drainages. It instead relied upon a qualitative evaluation of how any water or sediment could be delivered off the treated areas and if any increased water or sediment yields would be delivered to either of the first order drainages.

Reasonably Foreseeable Activities: Reasonably foreseeable activities that would occur in the cumulative effects analysis area include post-timber sale activities, ongoing road maintenance, ongoing noxious weed treatments, grazing, the proposed road reconstruction and timber harvesting planned to occur on privately managed lands and lands managed by the Idaho Department of Lands (IDL). On lands managed by the Forest Service within the analysis area of the Canyon Creek drainage, there are currently plans to underburn 15 acres and plant 7 acres. According to the IDL office (see memos in project file), there are no current plans to treat timber on State lands within the analysis area and there is one request on file with IDL by private citizens to harvest timber on private lands. For the purposes of this analysis, it is assumed that the timber on privately managed ground will continue to be managed heavily.

Alternative 1 - No Action Alternative: Considering the direct and indirect effects discussions above, the only potential cumulative effect is the risk of a stream crossing failure from the 597-G crossing on Canyon Creek. Should this failure occur, sediment delivery could be substantial enough to reach private lands. Sediment produced from

this failure in combination with private property activities could cause a cumulative effect downstream. There are no other activities or actions on National Forest land that would cause a cumulative effect.

Alternative 2 – Action Alternative:

Risk of Stream Crossing Failure: The risk of stream crossing failure would be reduced with the implementation of the action alternative. The proposed road improvements and closures described earlier, as well as in Appendix B, would provide cumulative positive long-term effects to the streams and ultimately fish habitat.

Sediment Delivery to Streams: Provided that best management practices and design criteria identified in this document (Chapter 2 and Appendix G) are implemented, then the estimated amount of sediment delivery to streams would be within the realm of natural variability and the streams would be able to process the predicted increases in sediment. The proposed roadwork would increase sediment delivery in the short-term by replacing/removing culverts, improving ditchlines and grading road prisms. Although there would be a short-term increase in sediment delivery, there would be a long-term net reduction in sediment delivery to the streams. The proposed road improvement work and vegetation treatments on federal lands under the action alternative in combination with the reasonably foreseeable activities, identified opportunities and proposed activities on privately managed lands would result in a short-term increase in sediment yield to the tributaries feeding into Canyon Creek, Middle Fork or East River. The long-term effect of the proposed road improvements would be a decrease in sediment delivery to the streams. The direct and indirect effects of proposed activities on sediment delivery would not be detected beyond the boundary of National Forest lands. Therefore, there should be no cumulative effects downstream.

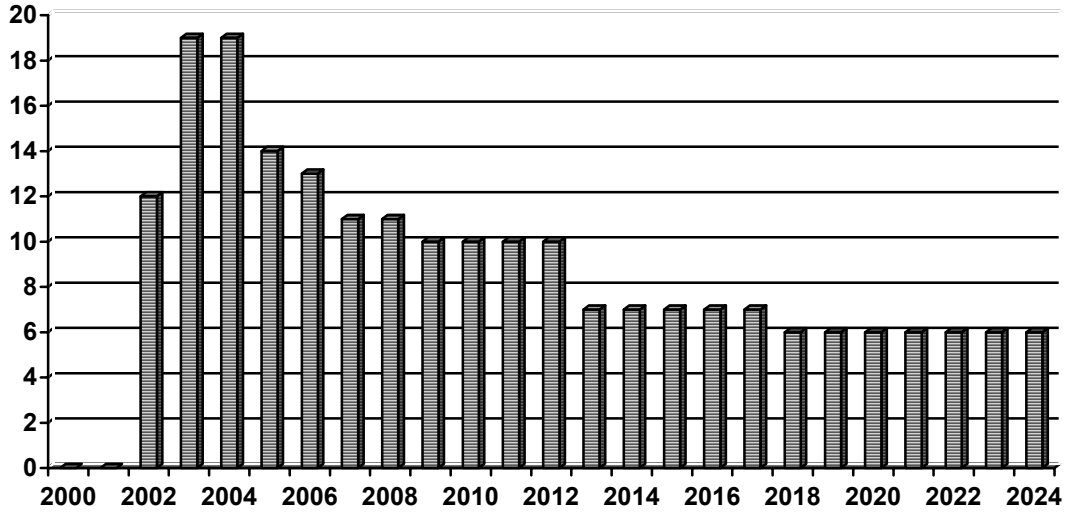

Figure 3-4. Predicted sediment yield changes and recovery resulting from Alternative 2 (Proposed Action). Measured in percent increase over existing annual sediment yields (2000-2013).

According to the results of the WATSED model, the sediment yield increase was mostly attributed to the proposed road work. Given the prescribed BMPS and the identified improvements and road closures, there will actually be a reduction in long-term sediment delivery to the streams within the project area. Measurable reductions in sediment delivery would occur because of the improved road surfacing, upgraded culverts and removal of abandoned culverts.

Water Yield Increases: Because there would be minimal increases in water yield under Alternative 2, the resiliency and channel morphology of the channels would be maintained. The percent change estimates are relative to the expected "natural" sediment and peak stream flows in watersheds with similar geomorphology, climate, and land use. Since there are no substantial direct or indirect effects, there would be no cumulative effects from water yield.

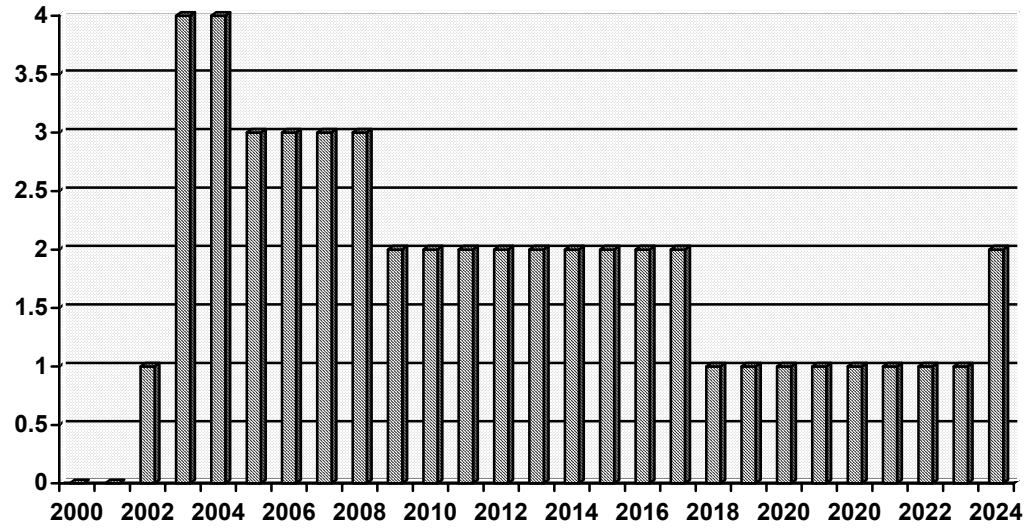

Figure 3-5. Predicted water yield changes and recovery resulting from Alternative 2 (Proposed Action). Measured in percent increase of peak annual water yields (2000-2024).

In assessing the effects of the proposed action alternative upon channel morphology, it is important to examine the natural range of variability for peak water yields and sediment yields. Though the water yield peak may be well within the historic range of natural variability, the landscape today has been and will continue to be altered by existing and proposed roads. The site-specific best management practices discussed in AppendixG would reduce sediment delivery associated with the implementation of Alternative 2.

Cumulative Effects to Fisheries: In consideration of the minimal influences from direct and indirect effects associated with the proposed project, the cumulative effects are not expected to change the existing condition trend for fisheries resources. In general, there would be long-term benefits to fisheries if the proposed roadwork were to occur.

The proposed activities, in conjunction with reasonably foreseeable actions, would cause an increase in sediment yield in the short term, but an overall reduction in sediment in the long-term. The short-term increase in sediment yield from the Canyon Creek Research Project is relatively small compared to the overall reduction in sediment yield and risk of sediment delivery resulting from the culvert upgrades and road improvements. The short-term increase in sediment may affect 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, and

may benefit individual survival in the long-term. Any increases in water yield would be localized and would not be measurable in fish-bearing channels.

3.24 Consistency with the Forest Plan and Other Regulations

3.24a Idaho Panhandle National Forests Plan

All alternatives meet the requirements of the IPNF Forest Plan for water resources. Specific requirements and how this project meets them are listed in Appendix H. Alternative 1 would not reduce the risk of road failure or improve the current conditions that are delivering sediment to stream channels. Alternative 2 would accelerate the timeframe for removing, replacing culverts that are at higher risk for failure. Both alternatives would meet the requirements for water resources in the Forest Plan (IPNF 1987).

All alternatives meet the requirements of the IPNF Forest Plan for fisheries. Specific requirements and how this project meets them are listed in Appendix H. Alternative 1 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 alternative would also meet the requirements for fisheries resources in the Forest Plan (IPNF 1987), as amended by the Inland Native Fish Strategy (1995).

3.24b Federal and State Standards:

With the use of BMPS and mitigation measures outlined in Chapter 2 and Appendix G the proposed activities on National Forest lands would comply with the Clean Water Act and would not adversely affect beneficial uses (refer to the Federal Checklist in the project file).

303(D) listed Stream Segment: In the DEQ report titled “Priest River Subbasin Assessment and Total Maximum Daily Load” dated October 2001, there is discussion regarding the listing of the East River and its tributaries, the Middle Fork and North Fork. At the time of the October 2001 report, the pollutants of concern for the East River, and its tributaries were sediment, dissolved oxygen and temperature. A table located in the project file illustrates the current and predicted changes to the TMDL listing for the East River and its tributaries. The source for the information is Glen Rothrock, TMDL Coordinator for the Priest River Basin, Department of Environmental Quality.

For the purposes of this document, it is conservatively assumed that the Middle Fork will remain listed for dissolved oxygen and temperature and that the North Fork and East River will remain listed for sediment, temperature and dissolved oxygen. Only the Middle Fork and the East River would be affected by this proposed action.

Effects to Sediment as a Pollutant of Concern: The proposed activities in the Canyon Creek, Middle Fork and East River would result in a net reduction of sediment

delivery to the major stream courses. By removing and/or improving existing culverts, there would be a reduction in the risk of having a culvert fail and deliver sediment to a stream. Additionally, the proposed road improvements (e.g. surfacing and construction of rolling grades) would further reduce the delivery of sediment to the streams.

Effects to Dissolved Oxygen as a Pollutant of Concern: Levels of available dissolved oxygen are a function of a variety of variables including water temperature, surface and intragravel water interchange, water velocity, substrate permeability and oxygen demand of organic material. The introduction of organic material to a stream may be one of the only possible means of affecting dissolved oxygen. According to research, the introduction of fine logging slash, leaves and needles into streams as a result of timber harvests can increase biochemical oxygen demand at critical times during low flows and high temperatures (Hicks et al. 1991). This increase in demand reduces the available dissolved oxygen. With the design of the proposed action (i.e. BMPs and riparian buffers), it has been concluded that the proposed activities would not change current levels of dissolved oxygen.

Effects to Stream Temperature as a Pollutant of Concern: The DEQ has adopted the stream temperature guidelines issued by the EPA for Bull Trout recovery. The temperature criterion for bull trout has a 7-day moving average of 10°C daily maximum for July through September. Stream temperatures in the Middle Fork and East River were documented by the DEQ in both 1998 and 1999. Temperature data collected by DEQ in 1998 (Rothrock 2001) indicate that two sites in the East River drainage and a tributary to the M.F. East River exceeded temperature standards for westslope cutthroat spawning and incubation for most days in July (Rothrock 2001). Similarly, EPA bull trout temperature standards were exceeded on most days from July –September (Rothrock 2001). In the Canyon Creek drainage, stream temperatures were taken as part of the stream survey. During those surveys, there were 16 occasions where stream temperatures were taken using a hand-held thermometer. Of those 16 readings, which were mostly recorded in September, none of the readings exceeded 10°C.

Researchers have clearly demonstrated that stream temperature may be altered by the removal of shade adjacent to a stream course. In this project, there would be no reduction in streamside shade and therefore, no increase in stream temperatures.

Overall Effects to Beneficial Uses: Implementation of the prescribed BMPs, design criteria, and the Antidegradation feedback loop would prevent adverse impacts to beneficial uses. In summary, this activity will adhere to the Clean Water Act, Idaho State Rules and Regulations, and would follow direction established by the Forest Plan.

Endangered Species Act: Both alternatives meet the requirements of the Endangered Species Act. Alternative 2 may affect but is not likely to adversely affect threatened bull trout, and would not jeopardize their continued existence.

Executive Order 12962: All alternatives are consistent with this executive order. Short-term effects of this project may affect westslope cutthroat trout individuals but

would not lead toward a trend in federal listing. Long-term effects (i.e., net reduction in sediment) are expected to benefit westslope cutthroat trout survival and habitat.

State of Idaho Governor's Bull Trout Plan: All alternatives are consistent with the direction in the Governor's Bull Trout Plan. Long-term effects are expected to benefit bull trout and their habitat.

3.3 Wildlife

3.31 Introduction

As presented in Chapter 2, the potential effects of the project on wildlife species was identified as an analysis issue. The following section briefly presents the important laws and regulations that govern how wildlife species are to be managed and protected. All of the Threatened, Endangered, Sensitive (TES) and Forest Plan Management Indicator Species (MIS) that are known to occur on the Priest Lake Ranger District are then reviewed to determine if the proposed activities could affect them.

3.32 Regulatory Framework

The regulations for the protection and management of wildlife habitat come from the following principal sources:

- The Endangered Species Act of 1973 as amended (ESA),
- The National Forest Management Act of 1976 (NFMA), and
- The Forest Plan for the Idaho Panhandle National Forest (IPNF)

Section 7 of the ESA directs federal agencies to ensure that actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

NFMA provides for balanced consideration of all resources. It requires the Forest Service to plan for diversity of plant and animal communities. The Act also directs the Forest to select Management Indicator Species (MIS) to help assess the impacts of land management decisions on the wildlife resource. The MIS concept assumes that by maintaining viable MIS populations, viable populations of existing and desired species will also be maintained for other wildlife species that have similar habitat requirements.

The Forest Plan, in compliance with NFMA, establishes forest-wide management direction, goals, objectives, standards and guidelines for the management and

protection of wildlife habitat and species, including management indicator species, sensitive species, and threatened and endangered species.

3.33 Selecting Species for Analysis

All of the Threatened, Endangered, Sensitive (including proposed species) and Forest Plan Management Indicator Species (MIS) that are known to occur on the Priest Lake Ranger District are listed in table 3-6. Each of these species was reviewed to determine if there was any evidence that they occurred (or that habitat existed for them) within the affected area, and whether proposed actions could potentially affect them. This evaluation was conducted by utilizing District and local sighting and survey records, scientific and historical literature on the species, timber stand exam information as well as professional judgment.

Species that do not occur or have habitat in the affected area are not relevant to the project and are not discussed in this EA (e.g., woodland caribou). The project file contains the rationale for dismissing them from analysis.

Some species that are known to occur or have habitat within the area (e.g., northern gray wolf) would not be affected by the project. These species are briefly discussed in this section of the EA and the rationale is provided for dismissing them from further analysis. The species that could be affected by the project are analyzed in detail. These include five species listed as sensitive on the Forest Service's Region One sensitive species list (black-backed and white-headed woodpeckers, fisher, flammulated owl and northern goshawk) and two Forest Plan MIS species (pileated woodpecker and American marten).

Table 3-6. Threatened, Endangered, Sensitive and Management Indicator Species (MIS) that are known to occur on the Priest Lake Ranger District and Analysis Status.

Status	Species	Species/Habitat Present?	Species/Habitat Measurably Affected?	Species Analyzed In Detail?
Endangered	Northern Gray Wolf	Yes	No	No
	Woodland Caribou	No	No	No
Threatened	Bald Eagle	Yes	No	No
	Grizzly Bear	No	No	No
	Lynx	No	No	No
Sensitive	Black-backed Woodpecker	Yes	Yes	Yes
	Boreal Toad	Yes	No	No
	Coeur d'Alene Salamander	No	No	No
	Common Loon	No	No	No
	Fisher	Yes	Yes	Yes
	Flammulated Owl	Yes	Yes	Yes
	Harlequin Duck	No	No	No
	Northern Bog Lemming	No	No	No
	Northern Goshawk	Yes	Yes	Yes
	Northern Leopard Frog	No	No	No
	Townsend's Big-eared Bat	No	No	No
	White-headed Woodpecker	Yes	Yes	Yes
	Wolverine	No	No	No
Management Indicator	American Marten	Yes	Yes	Yes
	Moose	Yes	No	No
	Peregrine Falcon	No	No	No
	Pileated Woodpecker	Yes	Yes	Yes
	White-tailed Deer	Yes	No	No

3.34 Species Analyzed in Detail

3.34a Introduction

The wildlife species that could be affected by the proposed activities are discussed in detail within this section. For each wildlife species, habitat requirements are summarized and the existing status of the species and its habitat is disclosed. A description of the process that was used for determining effects is presented and the direct, indirect and cumulative effects that the alternatives would have upon the species

is documented. Lastly, the effects of the project are compared to the goals, objectives and standards in the Forest Plan regarding wildlife management.

3.34b General Analysis Methodology

The combined area of the Canyon and Benton Creek drainages was selected as the cumulative effects analysis (CEA) area for all of the wildlife species that are analyzed in detail in this EA (see figure 3-6 for a map of the CEA area). This geographic area was selected as the CEA area based on considering factors such as: the species home range size in relation to its available habitat, topographic features that relate to how species move and utilize their home range (e.g. watershed boundaries), and boundaries that represent the point of diminishing potential effects. The CEA area is 5,519 acres in size. Approximately 5,185 acres are Forest Service, 174 acres are private land, and 160 acres are state land.

Table 3-7 displays the indicators that will be used to measure effects on wildlife species. Indicators for each species vary and are based on those factors that could result in a measurable adverse or beneficial effect. For species being analyzed, appropriate habitat parameters were measured to determine the amount of capable and suitable habitat. A discussion of the changes in suitable habitat for each relevant species and the effects on species are disclosed in following discussions.

Table 3-7. Issue indicators used to measure effects

Species	Indicator
Northern goshawk	▪ Effects to suitable and capable habitat.
Flammulated owl and White-headed woodpecker	▪ Effects to suitable and capable habitat.
Black-backed woodpecker	▪ Changes in distribution and quality of snag habitat.
Pileated woodpecker	▪ Changes to large snag habitat.
Fisher and Marten	▪ Effects to suitable and capable habitat, habitat connectivity and human activities and access.

An important concept in discussing changes in habitat conditions is the distinction between *capable habitat* and *suitable habitat*. Capable habitat refers to the inherent potential of a site to produce the necessary components to support a given species. Suitable habitat refers to habitat that is currently providing the necessary components to support a species. Therefore, habitat that is capable is habitat that is currently *unsuitable* but it has the potential to develop into a suitable condition. Habitat that is not capable does not have the potential to develop into a suitable condition.

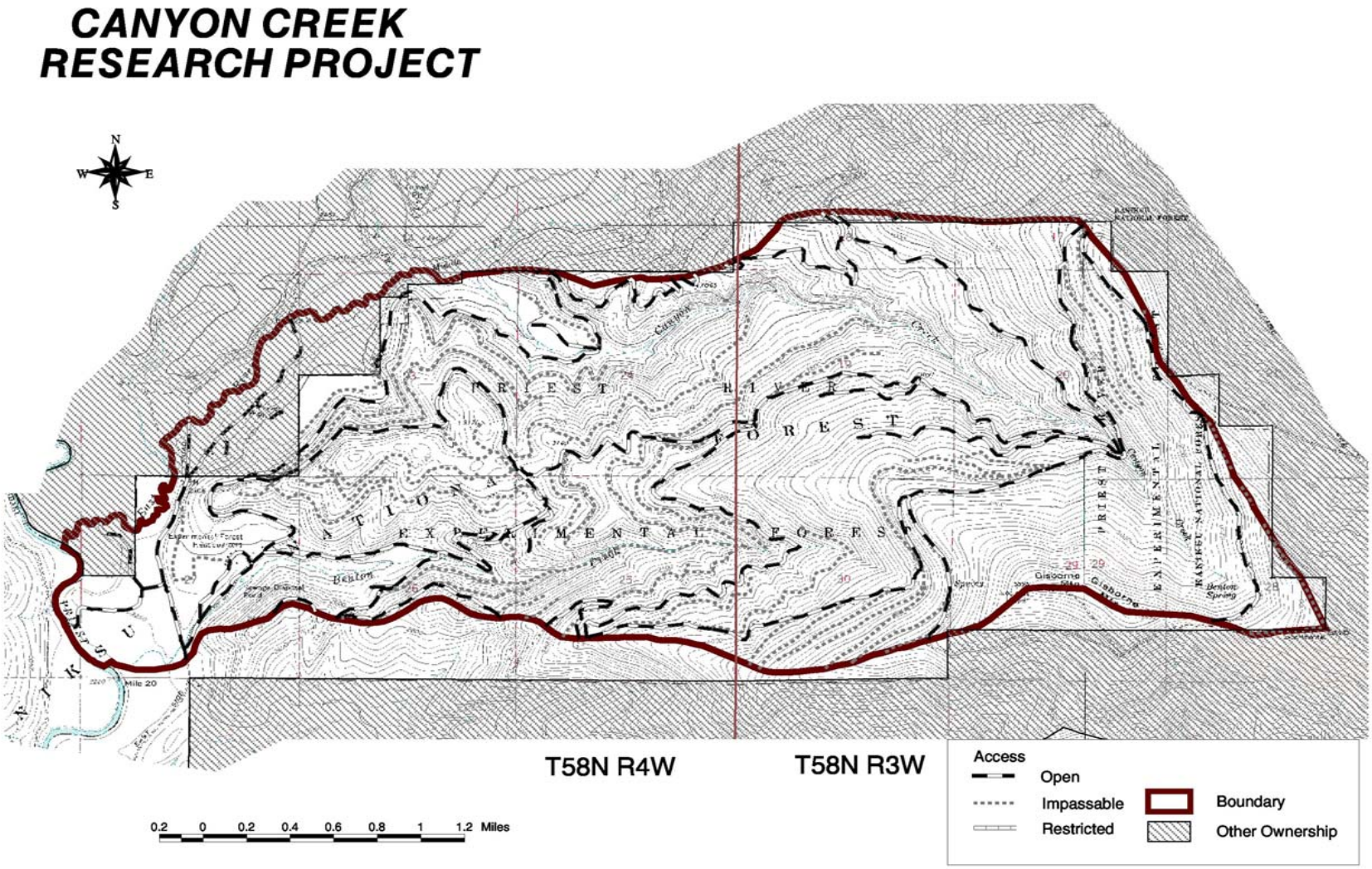

Figure 3-6. Map of analysis area for wildlife species.

3.34c Fisher and Marten

Because fisher and marten have many similarities in their habitat requirements and how they would be affected by the proposed activities, they were treated together in this analysis.

1. *Habitat Requirements for Fisher*

Fisher is a species that is rare throughout most of Idaho and it has been designated as sensitive by the Forest Service in this region. Fishers are medium-sized carnivores and tend to be opportunistic predators, eating anything that they can catch. Their major prey tends to be small to medium-sized mammals, birds, and carrion. Fishers are found only within North America and presently occur from southern Canada south into the northwestern states, California, and the Great Lake states. Fishers occur most commonly in landscapes dominated by mature forest cover. Within the Pacific states and the Rocky Mountains, they appear to prefer late-successional coniferous forests in the summer and mid to late-successional forests in the winter.

Fishers prefer habitats with high canopy closure (>80%), and "avoid areas with low canopy closure (less than 50%)" (Powell 1982). They also have been known to use riparian areas disproportionately more than other habitats (Jones and Garton, p. 386). In north central Idaho, grand fir and spruce forested riparian habitats were preferred by fishers in the summer (Jones, p. 90) and elevations from approximately 3000 to 5000 feet were used. In Jones' study, fishers avoided more open stands (<40 percent crown cover), drier habitats, and stands dominated by smaller trees (ibid). They are thought to predominantly inhabit mid-elevations in this area (Johnson pers. comm., 1991). The habitat requirements of fishers are thought to be more associated with the physical structure of the forest and associated prey. This structure includes the vertical and horizontal complexity created by a diversity of tree sizes and shapes, light gaps, dead and downed wood and the layers of overhead cover. Large-diameter spruce and grand fir snags and large downed material are used for denning and foraging. Fisher also need late-successional habitats "linked together by closed-canopy forest travel corridors" (Jones, p. 112). Fishers tend to avoid non-forested areas (Powell and Zielinski, p. 55). The home ranges for fishers vary with prey densities. Studies indicate that the mean home range for adult males is 15 square miles, which is nearly three times that of females, which is 6 square mile (ibid, p. 57). Jones 1991 study indicated a home range of 31 square miles (82.6 square kilometers) for males and 15.6 square miles (41 square kilometers) for females (Heinemyer and Jones, p. 13).

Fishers tend to avoid human presence and generally are more common where the density of humans is low and human disturbance is low (Powell and Zielinski, p 63). Where populations are low, fisher populations can be jeopardized by the trapping of coyote, fox, bobcat and American marten (ibid). Habitat security in the form of low road density reduces the risk of this occurrence because trapping areas are reduced. To provide for high integrity fisher habitat within a watershed area, at least 45% of the capable fisher habitat should be in a suitable condition. Moderate integrity fisher habitat would maintain 40-44% of the capable fisher habitat as suitable habitat. A watershed

area with less than 40% of the capable as suitable would be rated as low integrity habitat for fishers.

2. *Habitat Requirements for Marten*

The American marten was selected by the IPNF as an indicator species. It represents species that use mature and old-growth habitats, particularly the downed woody components. Marten are closely associated with mature to old-growth timber stands, preferring moist habitat types where small mammals are more abundant. American marten prefer stands with greater than 40 percent canopy closure, and tend to avoid those stands with less than 30 percent closure (Patton and Escano, p. 30). In addition to a closed canopy, marten require an abundance of large downed logs and snags (Buskirk and Ruggiero, p. 7). This provides secure resting locations, denning habitat and winter access to small mammals living beneath the snow (ibid). American marten are easily trapped and are highly vulnerable to over-harvest in areas accessible by fur trappers.

3. *Existing Condition for Fisher and Marten*

There are no known sightings of fisher or marten within the analysis area. However, in October 2001, fisher tracks were located within a timber-meadow complex approximately 6 miles to the west of the project area. No accurate estimates or records exist for historic populations of fisher or marten for the area. Despite the lack of any known occurrences of these species within the analysis area, suitable habitat does exist.

The assessment of the existing condition for fisher and marten concentrates on three factors that are the most pertinent for determining how the alternatives would affect these species; the amount of suitable habitat, habitat connectivity, and human activities and access. Relevant past and ongoing activities that have influenced these factors within the CEA area include: past vegetative treatments, road developments and maintenance, other land uses and developments in the area (e.g., home construction, grazing and haying on private lands), and the general amount of public use of the area.

Capable and Suitable Habitat

Capable fisher and marten habitat was identified as those timber stands in habitat type groups 3-8. These include: moderately dry Douglas-fir, grand fir, western red cedar, western hemlock, and cool and wet Engelmann spruce/subalpine fir habitat types. Suitable fisher and marten habitat was identified as capable stands that: 1) are in a sawtimber size classes with at least 20 trees per acre larger than 14” dbh, or are in a multisized or mature size class or larger, 2) have canopy closure of 50% or more as estimated from basal area, and 3) have not had a past regeneration-type timber harvest in any part of the stand.

There are currently 4,362 acres of capable, and 2,023 acres of suitable habitat within the analysis area for fisher and marten. The capable acres that are currently not suitable consist of young timber stands where the trees are too small to qualify as

suitable habitat. Most of these younger stands are a result of past regeneration type timber harvesting that occurred on the PREF from the mid 1960's through the mid 1980's for research projects. None of the 174 acres of private land within the analysis area was considered as suitable habitat for fisher or marten. Approximately 50% of the private land is not forested and the portion that is forested, does not meet the suitability requirements as the trees are too small and/or the stands are too open. Of the 160 acres of land within the analysis area that is managed by Idaho Department of Lands, approximately 145 acres is considered as being suitable denning habitat for fisher and marten. Based solely upon the amount of capable habitat that is within a suitable condition (46%), the analysis area is considered as having a high integrity rating for fisher habitat.

Habitat Connectivity, Human Disturbance and Access

As mentioned in the habitat requirement sections above, fisher and marten tend to avoid openings and young timber stands. Therefore, the value of suitable habitat can be diminished if areas of suitable habitat are isolated by large openings and/or young timber stands. These species (especially fisher) tend to travel along riparian corridors. Therefore, isolation of suitable habitat and other movement barriers along riparian areas probably has a greater impact than it would elsewhere. Connectivity of suitable habitat was considered in this analysis by reviewing a map of the suitable and capable habitat and qualitatively assessing the spatial arrangement of habitat. The current level of connectivity appears fairly high in the CEA area. Suitable habitat blocks are generally connected together and along most of the riparian areas, suitable habitat is not isolated.

As mentioned earlier, fishers tend to avoid areas where a lot of human activity is occurring. There are two areas in, and adjacent to, the CEA area that could be characterized as having a lot of human activity. The headquarters for the PREF is located near the southwest corner of the CEA area. Offices, cabins and other facilities and developments occur in this area (about 20 acres in size). This area (and the eastside county road near it) probably has a high enough level of human activity that fisher would avoid it. In addition, the private land that is located within the CEA area is near the northwest portion of the analysis area and residential homes occur in this area. Although it would not be possible to quantify the impact due to the lack of research on this topic, fisher would likely avoid the suitable habitat that exists adjacent to both of these areas because of the intensity of nearby human activities. With the exception of the two areas discussed above, the CEA area receives fairly light public and administrative use. Some berry picking, hunting and other recreational activities occur in the area but the intensity of this use is low. Therefore, the fisher and marten are not being disturbed from these areas.

The CEA area has a relatively high open road density. These roads allow easy access for trappers who may be targeting marten and other furbearers. Currently the trapping activity is low because of depressed fur prices. However, the presence of the numerous open roads in the area has the potential to affect marten populations in the future by allowing easy trapping access. Although fisher trapping is not legal, the easy access to

the area has the potential to affect fisher in the event that they were accidentally trapped when other species were being targeted.

4. *Environmental Consequences for Fisher and Marten*

The primary analysis indicator that was used in the determination of how the alternatives would affect fisher and marten was the changes to the amount of suitable habitat that would occur. However, habitat connectivity, human disturbance and access factors were also considered. The activities that are proposed that could influence fisher and marten are the vegetative, road and slash treatments. The improvement opportunities that are listed in Chapter II would not affect these species.

Table 3-8 summarizes the existing condition and the effects of implementing each alternative for fisher and marten. A more detailed explanation of the effects is disclosed in the following narrative.

Alternative 1

Direct and Indirect Effects: Suitable and capable habitat for fisher and marten would not be affected by this alternative. In addition, habitat connectivity, human activities and access would not change. Therefore, this alternative would not directly or indirect affect fisher or marten.

Cumulative Effects: Because actions associated with this alternative would not affect these species, the cumulative impact of implementing this alternative is the sum of the impacts of past, ongoing and reasonably foreseeable future actions. The description of the existing condition for fisher and marten that is provided above considers both past, as well as the ongoing activities.

The reasonable foreseeable activities described in Chapter 1 that are applicable to this analysis include: post sale and pre-commercial thinning activities on Forest Service lands, future road maintenance activities, the continued development and timber management activities on the private lands, and the continued general use of the area by the public. With the exception of the post sale and pre-commercial thinning activities that are foreseeable on Forest Service lands, all of the other foreseeable activities listed above are activities that are already ongoing and that would likely continue into the future. Therefore, there are no real additive effects from those activities over the effects disclosed above in the existing condition description. The foreseeable post sale and pre-commercial thinning activities scheduled for 32 acres (see Chapter 1 for additional details) on Forest Service land would result in a slight increase in human activity and disturbance within the CEA area. However, those activities would occur for a relatively short period of time. In addition, most of the post sale activities would occur fairly close to the headquarters of the PREF, which is an area that already has a fairly high human activities around it and thus fisher would probably avoid the area already. Therefore, the post sale and pre-commercial thinning activities are not expected to have any additional effects on the species.

Alternative 2

Direct and Indirect Effects: Within the proposed vegetative treatment units, there are a total of 357 acres of capable fisher and marten habitat. Approximately 291 of these acres are currently in a suitable condition. All of the proposed units are in suitable habitat except Units 2 and 6. This alternative would reduce the amount of suitable habitat by 78 acres. The way in which each of the vegetative treatments would affect fisher and marten is discussed below.

Vegetative treatments that utilize the free selection method would occur over approximately 199 acres of suitable habitat for fishers and marten. Areas that would be treated with this free selection method would remain suitable habitat for fisher and marten. The group selection method would occur on 9 acres of suitable habitat for fisher and marten. These areas would become unsuitable for fisher and marten, as the forest canopy would be opened up too much to retain suitability. Strip shelterwood harvests would result in reducing the suitable habitat for fisher and marten by 56 acres. This treatment will reduce overstory canopy overall, and create long, narrow openings that would become unsuitable habitat. The tree girdling/underburning that is proposed for unit 6 would reduce 13 acres of currently suitable habitat, to unsuitable.

With one exception (proposed Unit 6), this alternative would only create very small openings within the forest canopy as a result of the various vegetation treatments. Openings created in the forest under the free selection treatment method would be very small (.1 to .2 acres) and would not affect the connectivity of the suitable habitat. Openings created under the group selection and strip shelterwood treatments would be somewhat larger (.25 to 1.0 acre) but they would only encompass 20-25% of the area occupied by the unit. These somewhat larger openings could affect the marten and fisher movement to a small degree but they are not anticipated to affect connectivity. The openings are still so small that if they did avoid crossing the openings, they could readily travel around them. Unit 6, which would be treated by tree girdling and underburning, would create a 25-acre area where 35% canopy closure would be retained. This relatively low level of canopy closure over 25 acres could create conditions where these species would not travel through the area. However, the habitat both above and below the unit is suitable and could be used for travel corridors to and from habitat that exists in the surrounding areas that is suitable. Therefore, the vegetative treatments associated with this alternative would not significantly reduce the habitat connectivity for these species. In addition, the other proposed activities such as the road treatments, gravel pit expansion, and improvement opportunities (listed in Chapter II) would not affect habitat connectivity.

As previously mentioned in Chapter 1, the proposed roadwork, timber harvesting, and fuel treatment activities associated with the project would be completed within approximately five years. This work would not occur continuously for five years. Rather, it is expected that there would be occasions during this period where these activities would be occurring and occasions when they would not. While this work is conducted, the level of human activity in the area would increase over current conditions. This could

decrease the value of the suitable habitat in the area of the proposed activities, as these species (fisher more so than marten) would be more likely to avoid the area. However, if a displacement effect were to occur, these animals would still have approximately two-thirds of the CEA area that is not being affected and where human activities are relatively low.

As mentioned below in the wolf section, this alternative would result in the same amount of roads being left open to the public than currently exists. The alternative should not increase public access to the area and therefore, the alternative would not result in increased trapping pressure for marten or accidental trapping of fisher.

Cumulative Effects: The cumulative impacts of implementing this alternative would be the effects disclosed in the cumulative effects section of Alternative 1 (those effects from past, ongoing and foreseeable future activities) plus the effects associated with the activities that are proposed in this alternative.

This alternative would reduce the amount of suitable habitat by 78 acres. Suitable habitat in the CEA area would be reduced from its current level of 2,023 acres, down to 1,945 acres. This would reduce the percent of capable habitat that is suitable down to 45% (currently it is 46%) At this level, the CEA area would still be considered to have a high integrity rating for habitat. This alternative would also decrease habitat continuity slightly and increase human disturbance to a small degree.

Table 3-8. Summary of the existing condition and the effects of implementing each alternative for fisher and marten.

Analysis Indicators	***Existing Condition*** (includes past and ongoing activities)	***Alternative 1*** (includes past, ongoing and foreseeable activities)	***Alternative 2*** (includes past, ongoing, proposed and foreseeable activities)
Habitat Suitability- quantitative measure of how much habitat exists. Percent of capable habitat and acres of habitat that are suitable.	**46% Suitable** (2,023 acres)	**46% Suitable** (2,023 acres)	**45% Suitable** (1,945 acres-slight decrease from existing condition due to proposed vegetation treatments)
Habitat Continuity- qualitative measure of how easy the animal can move around territory	**High**	**High**	**High-Moderate** (slight decrease from existing condition due to openings created by vegetation treatments)
Access- qualitative measure to indicate potential mortality from trapping	**High**	**High**	**High**
Human Disturbance- qualitative measure to indicate disturbance	**Low-Moderate**	**Low-Moderate**	**Moderate** (slight increase in human disturbance due to proposed activities and foreseeable activities).

Consistency with Forest Plan and Other Regulations

Both alternatives would meet Forest Plan goals/objectives for managing habitat for fisher and marten. Alternative 1 would not impact the fisher or marten. Alternative 2 may impact individuals and habitat but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

3.34d Northern Goshawk

1. *Habitat Requirements*

The Forest Service in this region has designated the northern goshawk as a sensitive species. This species is a forest habitat generalist that uses a wide variety of forest ages, 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) in moderate to high tree densities (Warren 1990). Foraging habitat includes a wide range of forest age structures that provide a relatively open forest environment for unimpeded movement or flight through the understory. Nesting habitat is the most critical and limiting habitat feature for goshawks and therefore, the analysis focuses on this factor.

Management direction for the northern goshawk indicates that at least three suitable nest areas should be provided per nesting home range (5,000-6,000 acres) to maintain population distribution. The minimum stand size for a nest site is 30 acres. In addition, at least three replacement nest areas should be provided per home range area. All nest areas are best located within 0.5 mile of each other (Reynolds, et al. 1991).

2. *Existing Condition*

There have been no known goshawk sightings within the analysis area. In June 2000, surveys were conducted of capable nesting habitat in the project area and no goshawks were observed or heard during these surveys. Despite the lack of any known occurrences of these species within the analysis area, suitable habitat does exist.

The assessment of the existing condition for this species focuses on how much suitable and capable nesting habitat exists. Relevant past and ongoing activities that have influenced nesting habitat within the CEA area include: past vegetative treatments, road developments (clearing when the roads were initially constructed) and other land uses and developments in the area (e.g., home construction and other land use conversions from forest to other uses on private lands).

Capable Goshawk nesting habitat was identified as those stands in habitat groups 2-6 (moderately dry Douglas-fir, grand fir, western redcedar and western hemlock) with a slope of 40% or less. Suitable goshawk habitat was identified as those capable stands that: 1) are in a sawtimber or larger size class or a multisized size class, 2) are in a

Douglas-fir, grand fir, ponderosa pine, lodgepole pine, western redcedar, aspen, western hemlock, western larch or western white pine forest type, 3) are in sawtimber size classes with at least 20 trees per acre larger than 14" dbh, or are in multisized or old growth classes, 4) have canopy closure of 50% or more as estimated from basal area, and 5) have not had a regeneration-type timber harvest on more than ¼ of the stand.

An evaluation of habitat conditions within the project area indicates that there are approximately 3,525 acres of capable goshawk nesting habitat in the analysis area, 908 acres of which are currently identified as suitable. The majority of the capable areas that are currently not suitable are younger stands of timber that are too small to qualify as suitable nesting habitat. None of the 174 acres of private land within the analysis area were considered as suitable habitat for goshawk nesting. Approximately 50% of the private land is not forested and the portion that is forested, does not meet the suitability requirements as the trees are too small and/or the stands are too open. Of the 160 acres of land within the analysis area that is managed by Idaho Department of Lands, approximately 145 acres is considered as being suitable nesting habitat for goshawk.

Table 3-9 summarizes the existing condition and the effects of implementing each alternative for goshawk. A more detailed explanation of the effects is disclosed in the following narrative.

3. *Environmental Consequences*

The analysis indicator that was used in the determination of how the alternatives would affect goshawk was the change to the amount of suitable and capable nesting habitat. The activities that are proposed that could potentially influence goshawk nesting habitat are the vegetative and slash treatment activities. The road treatments and the improvement opportunities that are listed in Chapter 2 would not affect the goshawk nesting habitat.

Alternative 1

Direct and Indirect Effects: Suitable and capable nesting habitat for goshawk would not be affected by this alternative and therefore, this alternative would not directly or indirectly affect goshawk.

Cumulative Effects: Because actions associated with this alternative would not affect goshawk, the cumulative impact of implementing this alternative is the sum of the impacts of past, ongoing and reasonably foreseeable future actions. The description of the existing condition for goshawk is provided above and considers both past, as well as the ongoing activities. The reasonable foreseeable activities described in Chapter 1 are not relevant to the analysis for goshawk since none of those activities would affect nesting habitat. Therefore, there are no additive effects from foreseeable activities over the effects disclosed above in the existing condition discussion.

Alternative 2

Direct and Indirect Effects: The various vegetative treatments proposed in this alternative would reduce the amount of suitable nesting habitat for goshawk by 78 acres. Strip shelterwood treatments would reduce suitable nesting habitat by 56 acres. The group selection treatments would reduce the suitable habitat by 9 acres and the tree girdling/underburning treatment would reduce suitable habitat by 13 acres. All of these treatments would reduce overstory canopy levels to a degree that the areas would be unsuitable for nesting.

The free selection treatment would occur over approximately 168 acres of suitable nesting habitat for northern goshawks. However, these areas would still be suitable for nesting habitat after the proposed treatment.

Cumulative Effects: The cumulative effect of implementing this alternative on goshawk would be a reduction of nesting habitat from 908 acres to 830 acres within the CEA area. However, despite this reduction of suitable habitat, the amount and distribution of suitable nesting habitat would continue to be ample to provide numerous nesting locations.

Table 3-9. Summary of the existing condition and the effects of implementing each alternative for northern goshawk.

Analysis Indicator	*Existing Condition* (includes past and ongoing activities)	*Alternative 1* (includes past, ongoing and foreseeable activities)	*Alternative 2* (includes past, ongoing, proposed and foreseeable activities)
Habitat Suitability- quantitative measure of how much habitat exists. Percent of capable habitat that is suitable and acres of habitat that are suitable.	**26% Suitable** (908 acres)	**26% Suitable** (908 acres)	**24% Suitable** (830 acres- decrease from existing condition due to proposed vegetation treatments)

Consistency with Forest Plan and Other Regulations

Both 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 that could lead to federal listing under the Endangered Species Act (Forest Plan II-28). Alternative 1 would not impact the northern goshawk because it does not propose any activities or actions that would alter habitat conditions. Alternative 2 may impact individuals or habitat, but sufficient habitat would be retained to provide for

nesting and alternative nest sites. Therefore, the activity would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

3.34e Flammulated Owl and White-headed Woodpecker

Because flammulated owl and white-headed woodpecker are similar in their habitat requirements and how they would potentially be affected by the proposed activities, they were treated together in this analysis. Both of these species are on the Forest Service sensitive species list in this region.

1. *Habitat Requirements for Flammulated Owl*

Flammulated owls are seasonal migrants to northern latitudes during the spring and summer. They are attracted to relatively open grown, older forests of ponderosa pine and Douglas-fir that are associated with drier habitats. Reynolds and Linkhart (1992) reported that all published North American records of nesting, except one, came from forests in which ponderosa pine trees were at least present, if not dominant in the stand. The flammulated owl's preference for drier habitat types can be linked to food availability. Reynolds and Linkhart noted a stronger correlation between prey availability and these cover types than with other common western conifer cover types.

2. *Habitat Requirements for White-headed Woodpecker*

The white-headed woodpecker is restricted to drier forest habitats dominated by ponderosa pine and Douglas-fir trees in the mountains of far western North America (Frederick and Moore, 1991). Habitat requirements for this species are considered to be similar to that of the flammulated owl. Abundance appears to decrease north of California and is generally uncommon or rare in Washington and Idaho and quite rare in British Columbia.

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

3. *Existing Condition for Flammulated Owl and White-headed Woodpecker*

There are no known sightings of flammulated owl or white-headed woodpecker within the analysis area. However, there is a small amount of suitable habitat.

No population numbers exist for these species' historic presence. Inferences can be made when comparing the historical occurrence of ponderosa pine with current levels. Based on historic vegetation estimates, ponderosa pine cover types comprised 11% of National Forest lands within the Priest Lake subbasin. Today, only two percent of National Forest lands consist of sites that are predominately ponderosa pine (USDA draft in progress). This is a 82 percent decrease from historic conditions. Therefore,

suitable habitat for these species is probably less widespread today than in the past. Fire suppression has led to the advancing succession of species such as Douglas-fir and grand fir, that crowd out ponderosa pine. Currently, the project area has very little dry open grown ponderosa pine forest cover types.

The assessment of the existing condition for these species focuses on how much suitable and capable habitat exists. Relevant past and ongoing activities that have influenced habitat within the CEA area include: fire suppression, past vegetative treatments, road developments (clearing when the roads were initially constructed) and other land uses and developments in the area (e.g., home construction and other land use conversions from forest to other uses on private lands).

Capable habitat for these species was identified by habitat type alone: ponderosa pine and Douglas-fir habitat types (habitat groups 1-3), plus drier grand fir types (habitat group 4 on south, southwest or west aspects <= 3,000' elevation). Suitable habitat was defined as those capable stands that contained a ponderosa pine or Douglas-fir forest types, were in the sawtimber or larger size class or the multisized classes, contained at least one tree per acre larger than 14" diameter, and contained a canopy closure of 35-65%.

There are approximately 669 acres of capable habitat for these species within the CEA area and 42 acres are currently suitable. The amount of suitable habitat represents only 6 percent of the capable habitat. The majority of the capable areas that are currently not suitable are stands that are either too dense or are dominated by tree species other than ponderosa pine or Douglas-fir. None of the 174 acres of private land or the 160 acres of state land within the analysis area were considered as suitable or capable. The forested areas (some are not forested) in these other ownerships are on habitat types that are too moist.

Within the proposed vegetative treatment Unit 2, there are 27 acres of suitable habitat and 12 acres of capable habitat that is currently unsuitable.

4. *Environmental Consequences for Flammulated Owl and White-headed Woodpeckers*

The analysis indicator that was used in the determination of how the alternatives would affect these species was the change to the amount of suitable and capable habitat. The activities that are proposed that could potentially influence the habitat are the vegetative and slash treatment activities. The road treatments as well as the improvement opportunities that are listed in Chapter 2 would not affect the habitat.

Table 3-10 summarizes the existing condition and the effects of implementing each alternative for these species. A more detailed explanation of the effects is disclosed in the following narrative.

Alternative 1

Direct and Indirect Effects: This alternative would not directly affect capable or suitable

habitat for these species. However, by not conducting the proposed vegetation treatment within Unit 2, there would be an indirect effect in that the 27 acres of suitable habitat within this unit would become unsuitable as the stand becomes too dense in the future. In addition, the 12 acres of capable habitat within Unit 2 that is currently unsuitable would remain in this unsuitable condition.

Cumulative Effects: The description of the existing condition for these species is provided above and considers both the past, as well as the ongoing activities. The reasonable foreseeable activities described in Chapter 1 are not relevant to the analysis for these species since none of those activities would affect their habitat. Therefore, cumulative effects represent impacts from past, ongoing and proposed activities. In the short term, the amount of suitable habitat within the CEA area would stay at the existing level of 42 acres. Compared to Alternative 2, this alternative would lead to a decreasing amount of suitable habitat over the long-term as the stands become too dense (or remain too dense) to retain their suitability.

Alternative 2

Direct and Indirect Effects: Approximately 27 acres of suitable habitat for flammulated owl and white-headed woodpecker would be treated with the proposed activities within Unit 2. In addition, 12 acres of capable habitat occurs within this unit that is currently not suitable. The vegetative treatment of the unit would remove smaller Douglas-fir understory and thin younger ponderosa pine individuals. This would result in a more open stand with a higher percentage of large stems. The proposed treatment of the capable habitat within the unit would create stand conditions that are suitable for these species. The treatment of the suitable habitat would maintain its suitability for longer periods of time into the future than if the stand was not treated. During the short time-period when harvesting and fuel treatment activities would be occurring in the area, these species would likely avoid the area.

Cumulative Effects: This alternative would increase the amount of suitable habitat within the CEA area by 12 acres. Suitable habitat would increase from 42 (6% of the capable habitat) acres to 54 acres (8% of the capable habitat). In addition, 27 acres of suitable habitat would be treated with the effect of lengthening the amount of time that it would remain suitable (compared to not treating the area).

Table 3-10. Summary of the existing condition and the effects of implementing each alternative for flammulated owl and white-headed woodpecker.

Analysis Indicator	***Existing Condition*** (includes past and ongoing activities)	***Alternative 1*** (includes past, ongoing and foreseeable activities)	***Alternative 2*** (includes past, ongoing, proposed and foreseeable activities)
Habitat Suitability- quantitative measure of how much habitat exists. Percent of capable habitat that is suitable and acres of habitat that are suitable.	**6% Suitable** (42 acres)	**6% Suitable** (42 acres)	**8% Suitable** (54 acres- increase from existing condition due to proposed vegetation treatments)

Consistency with Forest Plan and Other Regulations

Both 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 (Forest Plan II-28). Both alternatives would affect flammulated owl and white-headed woodpecker habitat but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

3.34f Black-backed and Pileated Woodpeckers

Because black-backed and pileated woodpeckers are similar in their habitat requirements and how they would potentially be affected by the proposed activities, they were treated together in this analysis.

1. *Habitat Requirements for Black-backed Woodpecker*

Black-backed woodpeckers have been designated as a sensitive species by this region of the Forest Service. They normally occur in low population densities as year-round residents of coniferous forests. However, these woodpeckers tend to flourish and increase in population in early post-fire habitat (Hutto 1995). Following fire or insect and disease outbreaks that increase populations of wood-boring insects, the woodpecker experiences local population increases and temporary range extensions. Black-backed woodpeckers nest in snags or in live trees that are at least 5 inches in diameter and have heart rot. However, most nest trees are 10 inches in diameter, or greater (Mariani, et al., p. 3). They often use clumps of snags for nesting, and are known to nest in spruce, lodgepole pine, aspen, ponderosa pine, Douglas-fir, and western larch (Thomas 1979, p. 381; Harris, pp. 52, 53 and 60). Black-backed woodpeckers feed primarily on wood-boring beetles and specialize on large areas of burned forests or recently killed,

beetle-infested timber (Wright and Wales, p. 1). Breeding densities of black-backed woodpeckers vary considerably in response to prey availability, increasing up to seven times the normal level during beetle epidemics (Jackman, p. 101).

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

2. *Habitat Requirements for Pileated Woodpeckers*

The pileated woodpecker is a MIS species for the IPNF. It was selected as a MIS species because its highest densities occur in old-growth forests and because of its resultant need for large dead trees for nesting and dead woody material (standing and down) for foraging (Bull et al. 1990). 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 occurs in a wider ecological range of forest age structures, nesting habitat is considered the most critical and limiting feature for pileated woodpeckers.

Specific requirements for nesting include large trees in relatively uncut stands; with nest cavities usually located more than 30 feet above the ground--at a level with the canopy of the surrounding forest (Warren 1990).

3. *Existing Condition for Black-backed and Pileated Woodpeckers*

While there have been no recorded observations of black-backed or pileated woodpeckers in the project area, suitable habitat exists. An evaluation of snag habitat was used to assess the existing condition and the effects of the proposed activities on these woodpeckers. The distribution and quality of snag habitat was considered.

Relevant past and ongoing activities that have influenced snag habitat within the CEA area included: wildfires and fire suppression, past vegetative treatments, road developments and other land uses and developments in the area that have occurred on private land. In addition, forest insects (e.g., bark beetles) and diseases (e.g., root rot diseases, white pine blister rust and stem decay) have influenced the snag habitat that exists today.

For the analysis of the existing condition for suitable habitat the following assumptions were made: 1) private forest land within the CEA area does not contain suitable habitat because past, ongoing and foreseeable harvesting probably have resulted in very reduced snag levels; 2) on Forest Service and State land in the CEA area, areas that have had a past regeneration harvest are not suitable; 3) Non-forested areas do not have suitable habitat; 4) Young stands that have a seedling, sapling or pole size class are not suitable (except for a stand which had a pole size class, but also contained 56 trees per acre >14” diameter).

When conducting a snag habitat analysis, it is often assumed that because of firewood cutting, there would not be any suitable snag habitat adjacent to open roads. However, within the PREF, public firewood cutting is not allowed (except in rare situations such as cutting in slash piles) so areas adjacent to roads still have suitable snag habitat.

Currently, approximately 80% (4,410 acres) of the CEA contains suitable snag habitat. Some suitable areas contain scattered snags while other suitable areas contain higher snag densities that were created primarily from various forest insect and diseases (mostly bark beetle attacks, root diseases and/or white pine blister rust).

4. *Environmental Consequences for Black-backed and Pileated Woodpeckers*

The analysis indicator that was used in the determination of how the alternatives would affect these species was the change to the amount of suitable habitat and its quality. The activities that are proposed that could potentially influence the habitat are the vegetative and slash treatment activities. The road treatments as well as the improvement opportunities listed in Chapter 2 would not affect the snag habitat.

Table 3-11 summarizes the existing condition and the effects of implementing each alternative for these species. A more detailed explanation of the effects is disclosed in the following narrative.

Alternative 1

Direct and Indirect Effects: This alternative would not directly or indirectly affect the amount of suitable snag habitat that is available for these species. However, as compared to the proposed action, this alternative would not improve the habitat on 25 acres (as does the proposed action).

Cumulative Effects: The description of the existing condition for these species is provided above and considers both the past, as well as the ongoing activities. The reasonable foreseeable activities described in Chapter 1 that are relevant to the analysis for these species are the post sale/pre-commercial thinning activities that are planned for Forest Service land and the foreseeable timber harvesting that would occur on private property.

Regarding the post sale/pre-commercial thinning activity on Forest Service property, some overstory larch trees that are infected with dwarf mistletoe may be girdled in the next two years over approximately 6 acres. This would have a very small effect of increasing available snags for these species. However, the anticipated effect is so small that it was not included into the suitable habitat figures. Regarding the foreseeable timber harvesting on private land, all of the private land was already considered unsuitable habitat so additional management activities on those private lands would not change this determination.

Alternative 2

Direct and Indirect Effects: This alternative involves manipulating forest vegetation over approximately 329 acres. All of this area is currently considered as suitable habitat for the two woodpecker species. Group selection, strip shelterwood and free selection silvicultural treatments would be applied over 304 acres and trees would be harvested from these areas. In addition, a girdling treatment would be applied over 25 acres where trees would not be harvested. Rather, trees would be girdled and a prescribed underburn would be implemented over this 25-acre area.

Over those 304 acres where tree harvesting is proposed, some snags would be lost during the logging operations. Design criteria for these activities would retain (if available) a minimum of 4 snags per acre on dry sites and 6 snags per acre on moist forest types as specified in the design features. In addition, after the tree harvesting is conducted, approximately 65 acres (of the 304 acres) would be underburn and approximately 109 acres would have a jackpot burn fuel treatment applied. As is often the case with these types of fuel treatments, a small percentage of the leave trees would likely be killed when applying these treatments. The fire-killed trees would serve as additional foraging and/or future nesting habitat. Between the snags that are left after the harvesting, and those that would likely be created through the prescribed burning, it is expected that these 304 acres would remain in a suitable habitat condition for these species.

The proposed Unit 6, which involves a tree girdling/underburning treatment, would create a lot of snags over the 25-acre treatment area. While this area is currently considered as suitable habitat, this girdling/underburning treatment would increase the concentration of snags in this area and enhance the value of the area even further for these species. Black-backed woodpeckers, which tend to be attracted to concentrations of snags, would likely benefit from this treatment.

Cumulative Effects: This alternative would not change the amount of suitable habitat that currently exists. Suitable habitat would remain at 4,410 acres (80% of the CEA area) considering past, ongoing, proposed and foreseeable actions. However, the alternative would increase the quality of habitat on 25-acres.

Table 3-11. Summary of the existing condition and the effects of implementing each alternative for black-backed and pileated woodpecker.

Analysis Indicator	*Existing Condition* (includes past and ongoing activities)	*Alternative 1* (includes past, ongoing and foreseeable activities)	*Alternative 2* (includes past, ongoing, proposed and foreseeable activities)
Habitat Suitability- quantitative measure of how much habitat exists. Percent of CEA area that is suitable habitat.	**80% Suitable** (4,410 acres)	**80% Suitable** (4,410 acres)	**80% Suitable** (4,410 acres- although suitable habitat would remain the same, the quality of habitat on 25 acres would be improved, especially for black-backed woodpecker)

Consistency with Forest Plan and Other Regulations

Regarding the black-backed woodpecker, both 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 (Forest Plan II-28). Both alternatives would affect black-backed woodpecker habitat but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. Regarding the pileated woodpecker, both alternatives would meet Forest Plan goals and objectives for this species.

3.35 Species Not Analyzed in Detail

3.35a Northern Gray Wolf

1. *Habitat Requirements*

The gray wolf was listed as an endangered species in the lower 48 states in 1978. Currently the gray wolf is listed federally as an endangered species north of Interstate 90 and as an experimental population south of Interstate 90. The first Northern Rocky Mountain Wolf Recovery Plan was developed by an interagency team in 1980. A revision of the recovery plan was approved in 1987, after an extensive review and evaluation.

Wolves are large carnivores belonging to the dog family (*Canidae*). Wolves generally occur in low densities, are shy and have large home ranges. Wolves, within western North America, rely heavily on ungulate species (big game) as a primary prey item,

although other prey species such a hares or small animals may be utilized. Wolves are commonly associated with areas where big game is abundant, and often will follow big game population onto wintering areas. Wolves generally form packs consisting of more then one individual. Dispersing wolves are sometimes found in outlying areas that are claimed as part of territories of existing packs.

Wolf mortality associated with human/wolf interactions is considered one of the primary limiting factors in the recovery of wolf populations. The risk of mortality for wolves is strongly correlated with increasing levels of human access (Fredrickson, 1992). Misidentification of wolves by coyote hunters, deliberate killing and non-target mortality associated with coyote eradication efforts all are known to contribute to mortality of wolves, and are associated with increased levels of human access into areas that are occupied by wolves.

2. *Existing Condition and Rationale for No Further Analysis*

Based on Hanson (1986), habitat quality for wolves within the Priest Lake Basin is considered high. This is based on the abundance of prey species available, including the primary prey, which is white-tailed deer. White-tailed deer populations are largely controlled by winter weather conditions and the quality and quantity of winter range habitat. Other prey species for the wolf includes, moose, elk, mule deer and snowshoe hair. Potential habitat for wolves within the area surrounding the Canyon Creek Project Area is considered high quality as a result of the diversity and abundance of prey species.

Reliable reports of individual wolves have been reported within the general vicinity of the Canyon Creek Research project area. In the winter of 1995, a male wolf was inadvertently killed as a result of a coyote control program approximately 10 miles south of the project area. This wolf was traveling with another animal that was believed to be a female. Observations and reports of wolves within and adjacent to the project area have occurred during the winter and early spring months. The lack of observations during other seasons suggests that wolves do not inhabit the area yearlong.

Very little winter range habitat exists for white-tailed deer in the project area because of the overall topography and elevation. Project activities would not affect winter range habitat and thus the proposal would not adversely affect deer populations.

Currently there are approximately 38 miles of Forest Service roads within the project area (see Appendix B for more details). Approximately 25 miles of these roads are currently drivable and open to public and administrative traffic. The remaining 13 miles of road are currently brushed-closed. The proposed action would include opening up approximately 7.5 miles of the brushed-closed roads so that they could be utilized for the project. All of these roads would be gated closed and their use limited to just administrative and project related traffic. After the road and vegetative treatments are complete, the total road density within the project area would be reduced by 4.5 miles. As compared to the current density, the amount of road open to the public would not change as a result of the proposal.

As previously mentioned in Chapter 1, the proposed roadwork, timber harvesting, and fuel treatment activities associated with the project would be completed within approximately five years. While this work is being conducted, the level of human activity in the area would increase over current conditions. Therefore, the potential of human caused wolf mortality would increase slightly. As stated in the Features Common to All Action Alternatives, if any wolves did move into the project area, activities could be altered and protection measures employed for the wolves.

For all the reasons stated above, activities could affect wolves but would be not likely to adversely affect wolves. No further analysis will be conducted in this document, although applicable biological assessments would be completed in fulfillment of the Endangered Species Act.

3.35b Bald Eagle

1. *Habitat Requirements*

The bald eagle was classified as an endangered species on February 14, 1978. In 1994 the bald eagle was officially downlisted from endangered to threatened status. The recovery plan for the bald eagle was completed in 1986.

The entire project area is included in Zone 7 as designated in the Pacific States Bald Eagle Recovery Plan (page 29). Historically, this area was likely to have more bald eagles than currently because of the abundant fisheries. At the time of federal listing, bald eagles were uncommon in this zone. Key recovery areas in northern Idaho have contributed enough new territories to reach and exceed goals listed in the Recovery Plan. Originally, there was a target of two additional territories over and above the existing two territories in the Pend Oreille Lake and Pend Oreille River area. Today, there are at least 13 nesting territories within this area, including five known territories associated with the Priest Lake basin including Upper Priest Lake, Priest Lake and the Lower Priest River. This latter territory is approximately 8 air miles from the project area.

Bald eagles are winter visitors and yearlong residents of northern Idaho and northeast Washington. They are attracted to the area's larger lakes and rivers that provide most of their foraging opportunities (i.e. fish, waterfowl). Bald eagles select isolated shoreline areas with larger trees to pursue such activities as nesting, feeding, loafing, etc. Characteristics of bald eagle habitat include habitat for nesting, perching, roosting, feeding and also winter habitat. Nesting habitat requires proximity to sufficient food supply, dominant trees, and within line-of-sight of a large body of water (often within 0.25 mile of water). Nest trees typically are large ponderosa pine, Douglas-fir, western larch or cottonwood trees with open crowns in areas that are relatively free from human disturbance (Montana Bald Eagle Working Group 1991). The tolerance to disturbance is variable among individual eagles, but eagles tend to avoid nesting near human activity. Perches serve many roles for bald eagles. Eagles may use perches to hunt from, they often consume food items at favorite perch sites and perch sites and perches may be used as display sites or sentry posts to advertise and defend a breeding territory. Eagles usually perch in large trees or snags with sturdy horizontal branches

and commanding view of the surrounding landscape. Roosts are where eagles spend the night, and may not always be in close proximity to water and feeding sites. Bald eagles are opportunistic feeders and will prey on fish, waterfowl, and small mammals, and scavenge on carrion. Bald eagles are almost always associated with water, and fish and waterfowl make up the majority of their diet.

Winter roosts are relatively uncommon in the Idaho Panhandle. The majority of wintering eagles leave their nesting areas and congregate on unfrozen open water because of forage availability. These include Priest Lake and Priest River. Only a limited number of winter roost sites are known in this entire area, despite annual aerial winter counts. The highly vegetated shorelines are likely to provide adequate protection such that habitual roosts appear to be generally unnecessary.

During the winter, bald eagle populations at Priest Lake are supplemented by migrants from Canada. The presence of perch sites, roost sites, and access to prey are essential components of winter habitat for bald eagles. Wintering eagles commonly utilize large conifers and cottonwoods as perch sites along the lakeshore. Carrion becomes an especially important food source during the winter. Upland areas and big game winter ranges are heavily used when carrion is available, especially during hard winters when rivers and the lake are frozen over.

For nesting, bald eagles generally prefer solitude, late successional trees and forests, and shoreline areas adjacent to open water. The proximity of an adequate prey base, and the presence of large, mature trees to support nests are two of the most important elements of good nesting habitat. The tolerance to disturbance is variable among individual eagles, but generally eagles tend to avoid nesting near human activity.

Wintering bald eagles are commonly seen along the shorelines of Priest River and its tributaries. Mid-winter bald eagle surveys, which have been conducted since 1980, show that the shoreline adjacent to the Priest River has been utilized most of the years of the survey. The total survey route includes 18-point count observation stations.

Eagles are likely drawn to the shoreline area of Priest River because of availability of prey items such as waterfowl, fish and carrion. Wintering eagles commonly utilize large conifers and cottonwoods as perch sites along the lakeshore. Bald eagles along with golden eagles have been observed hunting inland from the shoreline of Priest Lake and Priest River in years when winter mortality has made white-tailed deer available as carrion.

2. *Existing Condition and Rationale for No Further Analysis*

Because of the lack of proximity of the project area to Priest River, perch sites and/or nesting habitat is not considered available within the project area. In addition, no known roast sites occur within the project area.

No known nest sites, perch sites or roasting areas for bald eagles are known within the project area or would be impacted by project activities. As stated in the Features

Common to All Action Alternatives, if any Bald eagles did move into the project area, management activities would be altered so that proper protection measures were taken. Thus, the proposed activities within the Canyon Creek project area would not likely have an adverse affect on bald eagles or habitat for bald eagles. No further analysis will be conducted in this document, although applicable biological assessments would be completed in fulfillment of the Endangered Species Act.

3.35c White-tailed Deer

1. *Habitat Requirements*

White-tailed deer were identified in the Forest Plan as a big game indicator species for the northern portion of the IPNF. The Forest Plan states that they are an indicator of good interspersion of cover and forage. They are very adaptable and prolific and thrive in a variety of habitat types. They are tolerant of disturbances such as agriculture and forestry practices, and prefer areas modified by these activities if an adequate arrangement of cover and forage is available. Some of the largest white-tailed deer populations in Idaho occur in the northern panhandle. In 1985, the Idaho Department of Fish and Game estimated that 99% of the State's population was found in the Department's two northern regions.

Climatic factors affect the seasonal variation of forage quality and quantity, accessibility to foraging areas and the energetic requirements of the animal (Pfingsten 1984). Winter is the most limiting and stressful period for big game. It is during this period when forage is scarce and travel is energetically very expensive because of snow accumulations. Consequently, in an effort to ameliorate conditions, deer locate themselves on lower elevations, concentrating on smaller, more confined areas known as critical winter range.

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 since rebounded to being the most abundant big game species in northern Idaho. Idaho Fish and Game's 1986-1990 statewide goals for white-tailed deer were changed from emphasizing increases in populations to maintaining populations, harvest, and recreational opportunities.

2. *Existing Condition and Rationale for No Further Analysis*

The Canyon Creek project area is located at elevations above and outside recognized critical winter range boundaries. Critical winter range is generally found at lower slopes and on valley floors below 3,000 feet where snow accumulations are moderate enough to sustain white-tailed deer populations.

Since white-tailed deer populations are prospering in north Idaho and the proposed actions would not impact critical winter range areas, no further discussion and analysis is necessary.

3.35d Moose and Elk

1. *Habitat Requirements*

Both moose and elk occur within the project area and were identified in the Forest Plan as indicator species. Elk was identified as an important big game indicator species for the central and southern portion of the IPNF and moose was identified as an indicator for the entire IPNF. Moose and elk occur in a variety of habitats but favor early successional stages of vegetation especially during winter. Early seral stages are necessary for winter foraging and cover is necessary for escape, thermal protection, and hiding.

2. *Existing Condition and Rationale for No Further Analysis*

As discussed in the previous section on white-tailed deer, none of the analysis area was identified as important winter range. Compared to white-tailed deer, moose and elk are able to use a broader range of habitats. As with white-tailed deer, proposed activities would not impact any areas that are important for wintering animals. In addition, open road densities would not be increased by the proposed activities. For these reasons, the proposal would not impact moose and elk populations and these species will not be analyzed in more detail.

3.35e Boreal Toad

1. *Habitat Requirements*

The Forest Service within this region has designated boreal toad as a sensitive species. No historic information on this species is known for the area. However, this species and several other amphibians are widely reported to be declining worldwide. This could be the result of several reasons. Historically, wetlands were much more abundant. Mortality is certainly much higher than historically because of roads and other factors. Finally, disease or some other widespread agent also is suspected in some declining populations.

Boreal toads require shallow water in ponds, lakes or slow-moving streams for breeding sites. Boreal toads lay their eggs in the warmest water available, typically less than 20 inches deep (Corkran and Thomas, p.86). Beaver ponds are often used for breeding. This species does not require much aquatic or emergent vegetation in its breeding habitat. After the brief spring breeding season, adult toads leave aquatic or habitats and travel to a variety of upland habitats. Radio telemetry research on boreal toads in southern Idaho found that toads can travel up to 2.5 kilometers (about 1 mile) from their natal ponds; it also showed that toads avoided crossing clearcut or similar openings (Bartelt and Peterson, p.2). Boreal toads in Colorado have been documented traveling up to 2.5 miles away (Loeffler, p.7).

It is important that toads be able to move among seasonal habitats. Tadpoles take at least two months to develop before growing into juveniles and dispersing from the breeding site into nearby upland habitats. Juveniles disperse from their natal ponds in late summer. The timing of dispersal depends on water temperature; in warmer water,

tadpoles and juveniles mature faster. The biggest potential barrier to their movements is roads. Steep road cuts can be a barrier to toads moving between seasonal habitats. Juvenile toads are vulnerable to being killed by motorized vehicles when they are dispersing from their natal ponds.

Much of the year toads are away from ponds, and located in terrestrial forest and non-forest habitats. According to Nussbaum et al. (198, p. 128), optimal habitat probably has moderate to dense undergrowth in more humid regions. Toads hibernate in the winter in habitats that maintain a high humidity and above-freezing temperatures.

2. *Existing Condition and Rationale For No Further Analysis*

Survey results combined with incidental observations indicate that this species is found throughout much of the Priest Lake Ranger District and is anticipated to occur within the project area. The mesic nature of much of the forests of the IPNF indicate that toads have many opportunities to find persistent small water sources for breeding, and could successfully disperse through moist forests. Based on habitat needs as described in the literature, a very high percentage of the North Zone, including private land, is suitable habitat.

The majority of impact to toads would be to breeding habitat. The Inland Native fish Strategy guidelines concerning riparian habitat conservation areas (RHCAs) for wetlands and riparian areas would prevent sedimentation of toad breeding habitat. Design features in this project would protect most of the likely breeding habitat, although this species breeds along roadside ditches that do not have any special protection. Some mortality occurs to adults and sub-adults in these situations, but it is unlikely to affect the population as a whole because of the high number of other opportunities for breeding habitat throughout the forest. For these reasons, this species is not analyzed in more detail in this document.

3.4 Sensitive Plants and Plant Species of Concern

3.41 Affected Environment

3.41a 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.

3.41b Introduction

There are no federally listed Threatened or Endangered plant species or US Fish and

Wildlife species of concern suspected to occur in the project area. No suitable habitat for listed Threatened plant species occurs in the project area. Refer to the TES plants report in the project file for information about those species and their habitats. Sensitive species are determined by the Regional Forester as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers or habitat capability which would reduce the species' existing distribution. Several Forest species of concern are also considered; while they are generally not at risk on a rangewide, region-wide or state level, they may be imperiled at the Forest level. Seventy-six sensitive plant species and Forest species of concern are known or suspected to occur in the Kaniksu portion of the IPNF, which encompasses the Canyon Creek 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.

3.41c Methodology and Prefield Review

Assessment of TES plant habitat occurrence was accomplished through review of Idaho Department of Fish and Game Conservation Data Center (ICDC) Element Occurrence Records and National Wetlands Inventory maps, aerial photographs and topographical maps, results of queries of the Timber Stand Management Records System (TSMRS) and professional judgment of the North Zone Botanist. Pre-field review was conducted in 2000.

As of 2000, no documented TES plant occurrences were known in the project area. Moist and wet forest habitat suitable for TES plants was determined to occur in several proposed harvest units and within the riparian influence of perennial and intermittent streams in the project area. A small amount of dry forest habitat was identified by the TSMRS queries in proposed project activity units. No aquatic, peatland, deciduous riparian, cold forest or subalpine habitat occurs in the project area.

1. *Field Survey Results and Post-Survey Review*

Field surveys for vascular plants were conducted in early September of 2000; surveys for bryophytes and lichens were conducted in mid-October of 2001. Surveys were completed in July of 2002. Populations of the sensitive moss "green bug-on-a-stick" (*Buxbaumia viridis*) were identified in several proposed harvest units. An individual deerfern (*Blechnum spicant*) occurs along an open road in the project area.

No other TES species or Forest species of concern were identified. Dry forest habitat identified by the TSMRS query was surveyed and found to have low potential to support sensitive plants. Microsites suitable moist forest habitat for sensitive moonworts (*Botrychium* species) occur in some proposed harvest units.

2. *Species Screen*

The Council on Environmental Quality (40 CFR 1502.2) directs that impacts be discussed in proportion to their significance. Generally, the following guidelines are used for determining the appropriate level of analysis:

No detailed analysis is necessary for species or habitat presumed not to be present within the affected area. Full disclosure of supporting rationale is included in the project file. No potential habitat for the Threatened species water howellia, Ute ladies'-tresses or Spalding's catchfly occurs in the project area. Of sensitive species and Forest species of concern, no suitable habitat for aquatic, deciduous riparian, peatland, subalpine, dry forest or cold forest guild species is present in the project area. These habitat guilds will not be discussed further.

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. Suitable habitat for sensitive moonworts and other moist forest and wet forest guild sensitive species and Forest species of concern has been documented in the project area, and may be impacted by project activities. "Green bug on a stick" moss occurs in areas proposed for harvest and may be impacted by proposed activities. Deerfern occurs in the project area, and may be impacted by project activities. These species will be analyzed in detail.

Rare Moonworts (*Botrychium* species)
Moonworts are seedless vascular plants that reproduce from spores and underground rhizomes. Rare moonworts species often occur together, usually in wet or moist forest habitat and/or near streams and in soils with well-developed mycorrhizae[1]. Some moonworts may also occur with other rare moonworts in or adjacent to wet meadows, open disturbed areas, old roads and roadside ditches.

Although no sensitive moonworts were identified during surveys in the project area, several harvest units contain suitable habitat for these species.

On May 10, 2001, the US Fish and Wildlife Service (USFWS) completed a 12-month status review of the Forest species of concern slender moonwort (*B. lineare*). The status review had been initiated after the species was petitioned for listing as Threatened or Endangered and it was determined that listing may be warranted. Following the review, USFWS determined that the species was warranted for listing but precluded because of higher priority species (USDI 2001c). One historical occurrence of slender moonwort is documented from the IPNF approximately 60 mile northwest of the project area but has not been seen since 1925. Habitat for slender moonwort across its range varies from [open] meadows, limestone cliffs and moist, shady woods (Wagner and Wagner 1994). However, a specific habitat description for the species is problematic because of its formerly widespread distribution ranging from sea level to

[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).

nearly 9,840 feet (Rey-Vizgirdas 2000).

No new occurrences of slender moonwort have been identified in the IPNF during numerous surveys in which other rare moonworts were documented. Suitable habitat for this species occurs in the riparian influence of several streams in the project area.

Green Bug-On-a-Stick Moss (*Buxbaumia viridis*)
Including the *Buxbaumia viridis* sightings documented for this analysis, there are currently 11 known occurrences of approximately 67 individuals on National Forest Lands in the IPNF (CDC 2001). 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. It grows as scattered individuals, and many populations consist of only one or a few individuals.

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).

Deerfern (*Blechnum spicant*)
Including the sighting documented for this analysis, there are currently 32 known deerfern occurrences of approximately 4,020 individuals on National Forest Lands in the IPNF (CDC 2001). The individual deerfern in the project area is potentially threatened by routine road maintenance activities, although it is located on the road cut bank, which is less susceptible to disturbance than the fill bank. Deerfern has been shown to colonize disturbed mineral soils, as evidenced by establishment of several populations of the plant on old road prisms (CDC 2001).

There is no conclusive evidence that canopy removal either benefits or threatens deerfern populations; however, recent monitoring of deerfern populations indicates that reproduction may, at least in the short term, increase after canopy removal (Hammet 1997, Hammet 2001 and Penny 1995). Deerfern is a coastal disjunct species - it is quite common in its main range west of the Cascade Mountains in Washington and Oregon, but rare in eastern Washington and north Idaho.

3.42 Environmental Consequences

3.42a 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.

3.42b Direct and Indirect Effects

Alternative 1

Under this No Action Alternative, there would be no direct or indirect effects to any TES or Forest species of concern or suitable habitat, since management activities would not change from current levels.

Alternative 2

Rare Moonworts (*Botrychium* species): There are no documented occurrences of rare moonworts in the project area. 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 project activities. Undetected individuals of these species in moderately to highly suitable habitat could be impacted under the action alternative. Such impacts would not lead to a trend to federal listing or a loss of population or species viability.

Based on current knowledge of the species' distribution, impacts to slender moonwort would not be expected to occur from implementation of this alternative. No project activities are proposed in identified highly suitable habitat for this species. Furthermore, although occurrences of other rare moonworts have been identified in numerous surveys on Priest Lake Ranger District, slender moonwort has never been documented.

Green Bug-On-a-Stick Moss (*Buxbaumia viridis*): All documented occurrences of this species would be buffered from project activities that could destroy the plants or disrupt habitat integrity. No direct or indirect impacts to the documented occurrences are expected, but undetected individuals may be impacted from project activities.

Deerfern (*Blechnum spicant*)
There would be no direct or indirect impacts to the individual deerfern documented in the project area. The location would be flagged to avoid incidental disturbance to the plant during project activities.

There would be no direct or indirect effects to any other moist forest guild TES plants or Forest species of concern from implementation of the action alternative. Suitable moist forest habitat could be impacted by removal of tree canopy and underburning.

3.42c Cumulative Effects

The cumulative effects area encompasses the Canyon Creek watershed, and is based on predicted seed dispersal distances (see TES plants report in the project file). The time frame for measuring cumulative effects to rare plants and suitable habitat is ten years following completion of harvest and other restoration projects. Beyond ten years, the likelihood of events or activities affecting rare plants and suitable habitat would be

difficult to predict. Cumulative effects to TES plants and suitable habitat are described as follows:

Very low – no measurable effects
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 sensitive plant species.
High – populations would likely be affected and/ior habitat capability may, over the long-term, be reduced below a level that could support sensitive plant species.

Cumulative effects analysis for rare plants considered the following activities on National Forest lands in the project area:

Past Activities and Events

- **Timber harvest research activities**
- **Road construction**

The above past activities in suitable habitat within the project area have almost certainly had detrimental impacts to rare moonworts and green bug-on-a-stick moss. Moss species were not included in the Regional Forester's sensitive plant list until 1999, and rare plant surveys prior to that time would likely not have identified the inconspicuous *Buxbaumia viridis*. Past activities may have also adversely affected deerfern; conversely, road construction apparently provided disturbed mineral soil in the road cut that was colonized by deerfern.

Ongoing and Reasonably Foreseeable Actions

- **Weed treatment and monitoring** – weed treatment activities apart from those listed as Design Features for the Proposed Action (Chapter II-2.5) would be subject to available funding. Any such activities would follow guidelines established in the Priest Lake Noxious Weeds Control Project FEIS (USDA 1997). Any herbicide use would follow label guidelines and would not exceed the maximum allowable acres to be treated established in the FEIS' adaptive strategy (USDA 1997). Impacts to TES plant species were analyzed in that document and its adaptive strategy. No impacts beyond those described in the FEIS are expected to occur. Surveys would be conducted as necessary before implementation of this activity in highly suitable habitat; identified populations of TES plants would be protected.
- **Timber stand improvement (tree planting and pre-commercial thinning in previously harvested units)** – tree planting and precommercial thinning would occur in previously harvested areas with low potential to support TES plants or Forest species of concern. Little additional ground disturbance would occur. No impacts would be expected to occur.
- **Routine road maintenance activities on open roads in the project area** – brushing and blading of open roads would not be likely to impact any documented sensitive plant occurrences. The location of the deerfern plant would be flagged to avoid direct impacts. Removal of canopy over the plant during brushing would not

be expected to have adverse impacts, based on recent monitoring of the species (Hammet 2001).

- **Timber harvest on private land adjacent to the Experimental Forest –** logging may occur over approximately 1-3 acres of private land that occurs within the Canyon Creek drainage. This area may support populations of rare moonworts, green bug-on-a stick moss and deerfern. Individuals of these species and suitable habitat may be adversely impacted.

Alternative 1

Implementation of this alternative, when combined with the past actions or reasonably foreseeable actions listed above, would not contribute any cumulative effects to sensitive moonworts or *Buxbaumia viridis* or suitable habitat. Cumulative impacts to deerfern and its habitat would be low, and cumulative impacts to suitable moist forest habitat for other rare plant species would be low.

Alternative 2

Cumulative impacts to sensitive moonworts under Alternative 2, when combined with the effects of past, ongoing and reasonably foreseeable actions, 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 which could support sensitive plant species).

Cumulative impacts to *Buxbaumia viridis* would be moderate. Cumulative impacts to deerfern populations would be low, while cumulative impacts to habitat for deerfern would be moderate.

Cumulative impacts to moist forest habitat for other rare plant species would be expected to be moderate.

3.42d Required Mitigation

In order for the above determinations to be valid, a qualified botanist must establish protection buffers in units with documented sensitive plant occurrences.

3.42e Forest Plan Consistency

A Forest Plan management goal is to “manage habitat to maintain populations of identified sensitive species of animals and plants” (Forest Plan, 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” (Forest Plan, 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” (Forest Plan, II-18). Both the no action and proposed action would meet Forest Plan direction.

3.5 Soil Productivity

3.51 Introduction

As discussed in Chapter 2, the potential impact that the alternatives would have upon the productivity of the soil was identified as an analysis issue. The following discussion begins with a summary of the laws and policies pertaining to the Forest Service regarding soil productivity. In the Affected Environment section, the factors that influence soil productivity are discussed as they relate to the proposed activities. The existing condition, and the effects that the alternatives would have on the important soil productivity factors are then disclosed.

3.52 Regulatory Framework

Direction for protecting site productivity comes from the following principal sources:

- Multiple Use-Sustained Yield Act of 1960,
- National Forest Management Act of 1976 (NFMA),
- 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 National Forest Management Act of 1976 (NFMA) charges the Secretary of Agriculture with ensuring research and continuous monitoring of each management system to safeguard the land's productivity. To comply with NFMA, the Chief of the Forest Service has charged each Forest Service Region with developing soil quality standards for detecting soil disturbances indicating a loss in long-term productive potential. These standards and guidelines are built into Forest Plans.

Management direction in the 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 land will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. The standards included in the Forest Plan (pp. II-32 and 33) are:

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

As indicated on page III-62 of the IPNF Forest Plan, exceptions to the standards mentioned above are allowed on Experimental Forests if they are necessary for research purposes. However, as explained in the environmental consequences section of this soil analysis, an exception to the soil standards is not required for the Canyon Creek Research Project. The proposed project is designed to meet the standards.

In 1999, the Regional Soil Quality standards were revised and now the standards specify that 85 percent of an activity area (i.e. treatment 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. These standards do not apply to intensively developed sites such as rock quarries, developed recreation sites, administrative sites, and system or other permanent roads.

Detrimental soil disturbance is defined as compaction with more than a 20 percent increase in soil bulk density (for volcanic ash-influenced soils), wheel rutting more than two inches deep in wet soils, displacement of more than one inch of topsoil from an area greater than 100 square feet, severely burned soil resulting from high-intensity burns of long duration, increased surface erosion generally greater than one to two tons per acre per year, and soil mass movement due to management activities.

3.53 Scope of Analysis

The analysis that was conducted in this Environmental Assessment focuses on how the alternatives would affect soil productivity in the immediate area of the proposed activities and whether or not the proposed action would meet standards. The IPNF and Regional Soil Quality Standards were designed to be applied at the level of the “activity area”. The activity areas are defined as the harvest/vegetation treatment areas and any adjacent roads or landings. Therefore, the intent of this analysis was not to describe soil productivity across the entire Experimental Forest or the entire “project area”. Rather, the scope of this analysis was narrowed to assess the existing condition and effects to soil productivity within the immediate vicinity of the proposed management activities.

After considering the regulatory framework for the protection of soil productivity, and the type and scope of the activities proposed for the Canyon Creek Research Project, it was determined that this project could potentially affect the productivity of the soil in three main ways. Activities could detrimentally disturb the soil, reduce the amount of woody debris in the treatment areas, or reduce the nutrient capital in the soil. Each of these soil productivity factors is discussed below. After initially considering each of them, some of the factors (or portions of them) were dismissed from detailed analysis because the proposed activities would not affect them. Through this process, the most relevant factors were identified and these were analyzed in detail by carrying them forward into the existing condition and environmental consequences sections.

3.54 Affected Environment

In this section, soil productivity is initially defined and discussed in a general fashion. Subsequently, the factors that influence soil productivity and that could potentially be affected by the proposed activities are identified and discussed. For a general summary of the soil types, landtypes, and geology that exist within the project area, see the Aquatic Resources portion of Chapter 3.

Soil productivity is defined as the output of a specified plant or group of plants under a defined set of management practices, or total plant mass that is produced annually per unit area. The most productive part of the soil occurs near the surface at the contact between the forest litter and the mineral soil. This is also the part of the soil that is easiest to disturb by management activities. The richest and most productive part of the soil is here, where the leaves, needles, and other organic litter have decomposed into a dark-colored material known as humus. This organic layer is frequently only a few inches thick, but is much more important than its thickness would indicate. Humus has high water-retaining capabilities, and contains a high percentage of the soil nitrogen, potassium, and microbes, which are very important to soil productivity. Below the organic layer is the volcanic ash, which occurs as the surface layer of mineral soil. In northern 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 enriched in organic matter, which again contributes nitrogen, potassium, and microbes to this part of the soil. The lower part has less organic matter and is not as fertile. This volcanic ash layer is a silt loam texture and has fewer rock fragments than the underlying subsoil and substratum. The ash layer has a high water holding and nutrient holding capacity, both of which are important for soil productivity. Most of the productivity of the soils is found near the soil surface.

3.54a Detrimentally Disturbed Soil

As described above in the discussion on the Forest Plan and Regional Soil Quality Standards, soil can be detrimentally disturbed in four main ways; compaction/displacement, severely burning the soil, high surface erosion rates, or mass failures. If any of these occurs, the productivity of the soil would be reduced.

Compaction and Displacement: The proposed action would increase the amount of compaction and displacement in some of the proposed treatment areas by using ground-based logging equipment to yard trees, by using machinery to pile slash, and by constructing fire lines around portions of some of the treatment areas. Soil compaction and displacement reduce the supply of air, water and nutrients to plants and therefore, soil productivity is reduced. Even though mitigation measures and design features would help to minimize the amount of soil that is compacted and displaced, these measures would not entirely eliminate adverse impacts. In order to demonstrate the level to which the proposed activities would increase compaction and displacement of the soils, this factor is considered in detail in the existing condition and environmental consequences sections.

Severely Burning the Soil: Severely burning the soil can also decrease soil productivity. Severe fires consume most woody debris and the entire duff and litter layer, exposing mineral soil. Burns that create very high temperatures at the soil surface when soil moisture content is low, result in almost complete loss of surface and upper soil horizon organics. In the event of a severe burn, 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).

The majority of the prescribed burning that is proposed with this project is underburning and jackpot burning. These burning activities would be limited to conditions where the top layer of mineral soil has a soil moisture level exceeding 25 percent. Based on past IPNF soil monitoring, this measure is highly effective in protecting the soil from severe burning (Niehoff 1985). Therefore, underburning and jackpot burning would not detrimentally disturb the soil and these factors are eliminated from further analysis. The only other prescribed burning that would occur with the proposed activities would be slash pile burning at landing sites and the burning of grapple piles. Because fuels are concentrated in these piles, burning them may create hot enough conditions underneath the piles that the soil is severely burned. This factor is addressed in more detail in the existing condition and environmental consequences section.

Another way the proposed project could potentially influence soil productivity from severe burning is by changing the likelihood that an intense wildfire would occur in the area and harm the soil. This project was not specifically designed to reduce wildfire risk in the project area. In addition, given the limited scope and potential effects that the proposed project would have upon the risk of intense wildfires, it was determined that this was not an issue that required detailed analysis. However, despite the lack of a comprehensive wildfire risk analysis, a few qualitative statements are included below on potential effects to soil productivity.

Within the actual areas that are proposed for vegetation treatments, the proposed project would temporarily increase the amount of surface fuels. A substantial amount of the fuels created be the project would be treated within a few years and those that are untreated would naturally deteriorate with time. Until the additional surface fuels are treated or naturally deteriorate, there may be an elevated risk that if a fire were to start under very dry conditions, that it would burn with a high intensity and cause harm to the soil. However, the risk is very small that an intense wildfire would occur in the proposed treatment areas and that the additional surface fuels created through the project would be the cause of soil damage. For this reason, this factor was eliminated from further consideration.

Surface Erosion: A third way that soil could be detrimentally disturbed is through surface erosion. As discussed above in the regulatory framework section, if management activities cause surface erosion in excess of one to two tons per acre per year, the soil is considered to have been detrimentally disturbed. Past observations on the IPNF of activities similar to those being proposed with this project, have indicated that surface erosion does not occur at that high rate unless the sites have already been

detrimentally disturbed through compaction and displacement, a severe burn, or a mass failure (Niehoff 2002a). Therefore, because those other factors are already being considered in assessing how the alternatives might detrimentally disturb the soil, surface erosion was dismissed from further analysis. See the Aquatic Resources section for a discussion of the potential for surface erosion to reach streams and affect water quality or fish habitat.

***Mass Failures*:** Lastly, mass failures can detrimentally disturb the soil. Organic matter, the productive ash layer, and even subsurface layers of the soil can be carried down slope when a failure occurs. The bare mineral soil areas that result from these failures are significantly less productive. In order to assess the potential for mass failures, the IPNF has developed a classification system using Landtypes. Landtypes are units of land that have similar biophysical characteristics and management implications. A relative rating of low, medium, or high has been assigned to each of the landtypes for mass failure potential. Mass failure potential is the potential that soil masses would move down slope. These ratings consider slope, soil depth, surface drainage characteristics, soil texture, and other factors. Observations on the IPNF of past mass failures have indicated that management induced failures have always been attributed to roads (Niehoff 2002b). Most often the failures were caused solely by some aspect of the roads. For example, drainage structures would fail or springs/seeps would saturate a road and cause a mass failure. Occasionally, a slump or slide was observed that was not immediately adjacent to a road. However, almost invariably these would occur on high failure potential sites that were heavily harvested some years before (often 10-20 years earlier) that had a road some distance above them. In these situations, the road served to concentrate water somewhere above the slide and the water would saturate the soil downhill from the road and produce a failure. In heavily harvested areas that occur on high failure potential sites, as tree roots from the harvested trees eventually decay, the strength of the soil diminishes and roads located above the area can trigger slides.

The areas that are proposed for vegetation treatments in Alternative 2 do not occur on high mass failure potential sites (mass failure potential map, project file). In addition, no new roads would be constructed with the proposed project. The tree harvesting that would occur with the proposed action would leave a substantial number of trees on the sites and roots from these trees would serve to provide strength to the soils. For these reasons, the potential that proposed actions would cause mass failures and detrimentally impact soil productivity is very low. Some road improvement work (e.g., replacing undersized or damaged culverts) would occur with the proposed action and those activities could potentially decrease the likelihood of road caused mass failures. The Aquatic Resources section contains a detailed discussion of those effects and therefore, they are not repeated here. For the reasons stated above, mass failure potential as it relates to soil productivity was dismissed from further analysis.

3.54b Maintenance of Woody Debris

Retaining large woody debris and organic matter in the soil is important to maintaining

soil productivity (Graham et al. 1994). Among other functions, adequate woody debris is necessary to sustain healthy populations of ectomycorrhizae fungi. These fungi assist plants in the uptake of nutrients and water from the soil. Research conducted on this topic resulted in management guidelines being developed to maintain adequate amounts of coarse woody debris and organic matter on site (Graham, et al., 1994). As specified in the design and mitigation measures for soils in Chapter 2, these guidelines would be followed and no detrimental impacts would occur to the productivity of the soil through the loss of woody debris. Therefore, the maintenance of woody debris as it affects soil productivity was eliminated from further analysis.

3.54c Maintenance of Nutrient Capital

General Nutrient Capital: The Intermountain Forest Tree Nutrition Cooperative (IFTNC) has been studying forest nutrition in the Inland Northwest since the early 1980's. Part of this research has focused on how forest management activities such as timber harvesting affect the nutrient status and productivity of the soil. Through this research, management recommendations were developed to preserve the nutrient capital on forest sites (Garrison and Moore 1998. p. 42). These recommendations were adopted for the Canyon Creek Research project and they are the same measures discussed below for potassium. Because most of the nutrients within a tree are located in the branches and the top of the tree (about 85%), management practices such as whole tree logging that remove this material from the site reduces the nutrient capital. Whole tree yarding is not proposed for this project and the slash that would be created with the proposed vegetative treatments would be left in the treatment areas. The majority of the fuel treatments that are proposed under this project are underburning (65 acres) or jackpot burning (109 acres). This prescribed burning would be done under moisture conditions where the nutrients stored in the organics would not be volatilized or lost in fly-ash. The proposed action includes grapple-piling slash over approximately 12 acres. Grapple piling slash has the potential to influence the distribution of nutrients on the site by concentrating the nutrient rich slash in the piles. However, prior to piling, the slash would be allowed to over winter on the site so mobile nutrients would leach out and return to the soil (Garrison and Moore, 1998). Therefore, other than the potential to affect potassium levels (discussed below), the proposed activities would not detrimentally affect the general nutrient status of the soils and this factor was eliminated from further analysis.

Potassium: This nutrient, and the way in which management activities might influence it, has recently received a considerable amount of attention. Research being conducted by IFTNC is showing that potassium is inherently very low within portions of the Precambrian metasedimentary rocks known as the Belt Supergroup (Garrison-Johnston et al. 2001). This Belt Supergroup is comprised of a series of formations, one of which is the Prichard formation, which occurs within a portion of the project area. Unlike many other soil nutrients, potassium is derived almost entirely from the underlying rock formations. Some preliminary research being conducted by the Cooperative is showing a possible link between potassium deficiency and the lack of tree resistance to root diseases and bark beetles attacks (Garrison and Moore 1998, Garrison-Johnston et al.

2001 p. 22). Studies indicate that when potassium is limited, the phenolic concentrations in the tree is lower and this could be responsible for predisposing the trees to root diseases or beetle attacks (Garrison and Moore, 1998).

In order to better understand how management activities might impact potassium levels and productivity, researchers have been trying to determine where the potassium is located in the ecosystem. In one study cited by Garrison and Moore (1998) researchers found that 45 percent of the potassium is held in trees, with the remainder being held in subordinate vegetation, forest floor and soil pools. Within trees, approximately 86 percent of the potassium was held in the branches, twigs and foliage (Garrison and Moore 1998). The remaining 14 percent was located in the tree bole. If potassium is removed from the site, the loss is long-term and whole tree yarding and the removal of tree tops has been shown to leads to the loss of potassium (Garrison and Moore, 1998).

The IFTNC is continuing to research potassium and different rock types in order to establish more definite thresholds for different tree species and determine how it influences tree growth and insect/disease resistance. Until these minimum thresholds are developed, the IPNF is using the following management recommendations from the IFTNC as a guideline for maintaining sufficient potassium on a site:

A. Practice conventional removal (lop and scatter) rather than whole tree removal. The "lop and scatter" technique should be practiced during intermediate as well as final harvest operations.
B. Let slash remain on site over winter so mobile nutrients such as potassium can leach from fine materials back to the soil.
C. Light broadcast burn or underburn for release of potassium and other nutrients.
D. Avoid mechanical site preparation on ground not protected by snow or slash.
E. Plant species appropriate to site.

These measures have been incorporated into the design and mitigation measures for soils in Chapter 2. However, even with the use of these protection measures, the proposed activities would reduce available potassium through the removal of tree boles. For this reason, this factor is considered in more detail in the existing condition and environmental consequences sections.

3.54d Existing Condition

The most relevant soil productivity factors that could be influenced by the proposal were identified in the Affected Environment section above. These include the amount of detrimentally disturbed soil (as influenced by compaction and displacement of soil and severe burning from slash piles) and potassium levels. The following section discloses the existing condition and the methodology that was used to determine the current condition for these factors.

1. *Existing Condition and Methodology for Determining Detrimentally Disturbed Soil*

To determine whether past soil disturbing activities have occurred in the areas proposed

for treatment, the following information was used: the electronic data base and hard copy information from past harvest activities that are recorded in the Timber Stand Management Record System (TSMRS), field observations and aerial photos. Using these sources of information, past acres of detrimentally disturbed soils were determined for each of the proposed treatment areas. Proposed treatment areas were reviewed for any evidence that the sites may contain detrimentally disturbed soils. These areas were investigated for evidence of such things as past logging or fuel treatments, skid trails, temporary roads (permanent roads are not counted) and landings.

Using past Forest Plan monitoring data of areas that had been logged and/or have had fuel treatments conducted on them, average amounts of detrimentally disturbed soils have been determined for various treatment types (Niehoff 2002c). During these monitoring efforts, transects were established and data was collected on the amount of soil that was detrimentally disturbed. This process was repeated for various types of logging systems and slash disposal methods. From this monitoring information, average detrimentally disturbed soil "coefficients" were calculated for the various treatments and these could then be applied to areas that were treated in a similar fashion in the past to determine the existing condition. In addition, these disturbance coefficients could be applied to proposed treatments to determine the effects from implementing the alternatives. For example, past monitoring has shown that areas that were logged after 1999 using a tractor and where the slash was subsequently grapple piled, had an average of 13% detrimentally disturbed soil. Therefore, unless other information (such as field observations) was available to the contrary, if a particular area had been treated in a similar fashion then it could also be assumed to have a detrimentally disturbed soil level of 13%. With other features like temporary roads or isolated skid trails, the amount of detrimentally disturbed soil was calculated based on the approximate area occupied by these features. This same methodology was used in the analysis of effects.

The Timber Stand Management Record System (TSMRS) was reviewed for the proposed treatment areas and no previous harvest or fuel treatment activities (with the exception of one error that was found) had been recorded (see project file). In addition to using the TSMRS database to determine if proposed treatment areas had been previously detrimentally disturbed, a forester walked the proposed treatment areas and evidence of past activities was noted (see project file). From these field observations, it was noted that some small areas within some of the proposed units did contain compacted soils. Two proposed Units, 9 and 12, had old skid trails present within them. One skid trail was noted in Unit 9 and two trails in Unit 12. Because of the limited number and extent of the trails, it appeared that the old trails were probably constructed to access very small areas for salvaging individual trees. Therefore, a detrimentally disturbed coefficient was not applied to the entire proposed treatment area. Rather, the amount of detrimentally disturbed soil was calculated for the area occupied by the skid trails themselves. In addition to these skid trails, three of the proposed treatment units (6, 7 and 13) contain portions of temporary or unclassified roads within them. Because these roads are not currently considered system or permanent roads, they were

included as areas of detrimentally disturbed soil in the calculations. Permanent roads are considered "dedicated" lands and are not included in the calculations. From the review that was conducted of the proposed treatment areas using the TSMRS, field observations, and aerial photos, no other evidence of detrimentally disturbed soil was apparent within the analysis area. For example, no evidence of severe burning, mass failures or lack of woody debris was noted in the analysis area. As discussed in the Aquatic Resources section, a mass failure occurred within the Benton Creek drainage as a result of a road failure in 1997. However, that failure is outside of the soil analysis area so it was not calculated in the detrimentally disturbed calculations presented below.

Table 3-12 contains the number of acres and percent of area that is currently detrimentally disturbed within the proposed treatment areas. Five of the thirteen units (6, 7, 9, 12 and 13) that are proposed have a small amount of existing detrimentally disturbed soil. Over these units, a total of approximately 2.2 acres has been detrimentally disturbed. This represents an average of 0.7% of the treatment area. With the exception of Unit 7, only a very small percentage of any of the units is currently detrimentally disturbed. Unit 7 is a control unit for the proposed research project and would not be manipulated. This unit has an average of 11% of the soil in a detrimentally disturbed condition and this is due to the two roads (597A3 and 597N7) that run through the unit that are currently unclassified roads. These roads are currently considered temporary and therefore, are included in the calculations. Currently all of the proposed treatment areas have less detrimentally disturbed soil than the Regional Standard of 15%.

2. *Existing Condition and Methodology for Determining Potassium Levels*

As mentioned above, a portion of the project area contains a geologic formation known as the Pritchard formation. Research has indicated that soils occurring on this formation are relatively low in potassium. To determine which of the proposed treatment areas were located on potassium limited soils, the treatment units were overlaid onto the geology map (see project file). Six of the proposed treatment areas occur on the Pritchard formation. All of Units 3 through 6, and portions of Units 1 and 2 occur on this formation. In total, 166 of the 329 acres that are proposed for treatments occur on the Pritchard formation.

As described above in the Affected Environment section, some management practices such as tree harvesting (especially removing foliage), slash disposal techniques, or severe burns could reduce the level of potassium on a site. However, with the exception of a very minor amount of tree harvesting in a few areas, none of these practices occurred in the past on the sites that are proposed for treatment. Therefore, it is assumed that the existing potassium level on these sites has not been reduced by previous management activities.

3.55 Environmental Consequences

The following analysis discloses the environmental consequences of each alternative as

they affect soil productivity. The most relevant soil productivity factors that could be influenced by the proposal were identified in the Affected Environment section above. These include the amount of detrimentally disturbed soil (as influenced by compaction and displacement of soil or severe burning from slash piles) and the loss of potassium. The quantitative issue indicators that are used in Chapter 2 to compare alternatives with one another are the acres of detrimentally disturbed soil and the number of acres of tree harvesting that would occur on potassium limited soils.

Direct effects on soil productivity is measured and described by analyzing how the alternatives would affect the amount of detrimentally disturbed soil that results from compaction and displacement or severe burning of the soil. As previously mentioned, if the soil is affected in these ways, the physical, chemical and biological properties of the soil are harmed and the productivity of the soil is reduced.

Indirect effects to soil productivity include the potential that the alternatives would result in the loss of potassium from the site and affect soil productivity or the ability of trees to resist beetle or root diseases.

Cumulative effects were considered by assessing how the direct and indirect effects of the alternatives could combine with past, ongoing and reasonably foreseeable activities to influence the amount of detrimentally disturbed soil or potassium levels. Since the direct and indirect effects to soils do not extend beyond areas actually impacted, the cumulative effects analysis area consists of the areas proposed for soil-disturbing activities within the project area where previous activities have occurred.

In the consideration of cumulative effects, the ongoing and reasonably foreseeable activities disclosed in the beginning of Chapter 3 were reviewed. However, those actions would not occur in the same area as the proposed soil disturbing activities associated with this proposed project and therefore, they fall outside the cumulative effects analysis area for soils. On the Experimental Forest, the post sale and pre-commercial thinning activities associated with previously harvested areas would not occur in areas proposed for treatment with this project. Similarly, the noxious weed treatments and ongoing road maintenance activities that are described as foreseeable actions in the Experimental Forest would not occur in the same area as the proposed activities. In addition, the effects from the foreseeable activities on private land would also not occur in the cumulative effects analysis area for soils.

Alternative 1

<u>*Direct and Indirect Effects*</u> (both detrimentally disturbed soil and potassium levels). This alternative would not directly change the existing level of detrimentally disturbed soil in the analysis area. Machinery would not operate on the soils and therefore, no additional compaction or displacement of the soil would occur. In addition, because slash piles would not be created and burned there would not be any areas detrimentally disturbed as a result of severe burning. Tree boles would not be removed from timber stands on potassium limited soils and therefore, the existing level of potassium would

not be reduced.

Cumulative Effects: Since this alternative would not directly or indirectly affect the amount of detrimentally disturbed soil or potassium levels, there would be no cumulative effects associated with implementing this alternative.

Alternative 2

1. *Detrimentally Disturbed Soil:*

Direct/Indirect Effects. Activities that are proposed with this alternative would result in a direct effect of detrimentally disturbing approximately 7.0 acres (2.1% of the analysis area) of soil through compaction and displacement of soil or severe burning from grapple piles (table 3-12). Physical, chemical and biological properties of the soil would be impacted on these 7.0 acres and the productivity of the soil would be reduced. The compaction and displacement of 7.0 acres would occur as a result of using some ground-based logging equipment (tractor or rubber tired skidder), grapple piling and burning slash, and constructing firelines. For this analysis it was assumed that the ground-based logging would occur during non-winter months when the potential impact would be the greatest. If any of the ground-based logging were to occur on snow or on frozen soils, the level of compaction and displacement would be less than predicted in this analysis.

Table 3-12. Existing, proposed and cumulative amount of detrimentally disturbed soil in acres and percent of the treatment areas.

		Existing Condition (No Action)		Alternative 2 (Proposed Action)		Cumulative Effects	
Unit #	**Proposed Treatment Acres**	**Acres of Detrimentally Disturbed Soil**	**Percent Of Activity Area Detrimentally Disturbed**	**Acres of Detrimentally Disturbed Soil**	**Percent Of Activity Area Detrimentally Disturbed**	**Acres of Detrimentally Disturbed Soil**	**Percent Of Activity Area Detrimentally Disturbed**
1	68.0	0.0	0.0	0.0	0.0	0.0	0.0
2	40.0	0.0	0.0	0.1	0.3	0.0	0.0
3	15.0	0.0	0.0	0.0	0.0	0.0	0.0
4	25.0	0.0	0.0	1.0	4.0	1.0	4.0
5	31.0	0.0	0.0	4.0	13.0	4.0	13.0
6	25.0	0.4	1.6	0.1	0.4	0.5	2.0
7	0.0	1.1	11.0	0.0	0.0	1.1	11.0
8	39.0	0.0	0.0	0.0	0.0	0.0	0.0
9	13.0	0.1	0.9	0.4	3.0	0.5	3.9
10	20.0	0.0	0.0	0.0	0.0	0.0	0.0
11	30.0	0.0	0.0	1.0	3.3	1.0	3.3
12	13.0	0.2	1.0	0.4	3.0	0.6	4.0
13	10.0	0.4	4.0	0.0	0.0	0.4	4.0
	Total 329	Total 2.2	Average 0.7%	Total 7.0	Average 2.1%	Total 9.1	Average 2.8%

The combination of skidding trees with ground based logging and grapple piling or burning of the slash would result in detrimentally disturbing approximately 6.8 acres out

of the total 7.0 acres that would be disturbed with the alternative. Approximately 53 acres of the proposed vegetation treatments would involve skidding trees with ground-based logging equipment. This would occur in portions of Units 4, 9, 11 and 12, and within all of Unit 5. Past monitoring has shown that when tractor or rubber tired skidders are used to harvest trees and 100-foot skid trail spacing is used, an average of 13 percent of the area is compacted or displaced (Niehoff 2002c). In the analysis that was conducted, this figure was used. As presented in the design features and mitigation measures for soils in Chapter 2, 100-foot skid trail spacing would be required. On a portion of these 53 acres (approximately 12 acres), slash would be piled using a grapple machine. Past monitoring shows that when grapple piling is done after tractor yarding, and the piling is done on existing trails or slash, that the piling in combination with tractor yarding also detrimentally disturbs approximately 13 percent of the area (Niehoff 2002c). This figure includes any of the areas that were severely burned as a result of burning the grapple piles. For these reasons, 13 percent was used for both the acres that would be tractor yarded without grapple piling and those that would be tractor yarded with grapple piling.

This alternative would involve harvesting trees on an additional 251 acres using the skyline logging system. Past monitoring of this logging system has shown that it does not detrimentally disturb the soil (Niehoff 2002c). Therefore, this analysis assumed that skyline yarding would not detrimentally compact or displace the soil.

In addition to compacting and disturbing some soil through ground-based logging and grapple piling, firelines would be constructed around portions of two units with this alternative. In order to conduct the proposed prescribed burning in Units 2 and 6, some fireline construction is needed. Both excavator and hand-constructed fireline would occur around a portion of Unit 2. Hand constructed fireline would be created around portions of Unit 6. This fireline construction would compact or displace soil on approximately 0.2 acres (project file).

In association with this alternative, no new road construction would occur and thus there would be no additional soil compaction or displacement caused from this activity. With the exception of the proposed road decommissioning that is discussed below, the proposed road treatments that are described in Chapter 2 for existing roads would not result in additional compaction or displacement of soil. This alternative includes decommissioning approximately 2.5 miles of road. This would permanently close the roads. Activities associated with closing these roads (see the proposed action description for more detail) would have an indirect, small beneficial effect on soil productivity. Decommissioning these roads would allow the soil to slowly become more productive. However, because this recovery process would still take a very time this beneficial effect was not quantified in the calculations for detrimentally disturbed soils described above.

In order to conduct the road improvement activities that are proposed for this alternative, it would be necessary to expand an existing gravel pit in the project area by approximately 0.1 acre (see Chapter 2 for a more thorough discussion). Although

conducting this activity would eliminate the soil productivity for this area, this impact was not included in the calculations within table 3-12. The Regional and Forest standards regarding soil productivity consider developed sites such as gravel pits as dedicated land and they are not included in the analysis to determine if standards are being met. This is also true for landings adjacent to permanent roads.

The aquatic and noxious weed improvement opportunities that are listed in Chapter 2 would occur if funding became available. If implemented, these activities would not affect the level of detrimentally disturbed soil.

Cumulative Effects. As disclosed earlier in the existing condition section for compaction and displacement, a small amount of the analysis area was previously detrimentally disturbed. This past impact was added to the predicted effects of the proposed action to determine the cumulative effects. The ongoing and foreseeable future actions that were identified in the beginning of Chapter 3 would not occur in the soil analysis area and thus those actions would not result in cumulative effects.

Table 3-12 displays the cumulative effects that are predicted for detrimentally disturbed soil. Cumulatively, 9.1 acres (2.8 % of the analysis area) within the analysis area would be detrimentally disturbed through the compaction/displacement of soil. For individual proposed treatment units, the cumulative detrimentally disturbed soil level ranges from 0 percent to 13 percent. These fall within the Forest Plan and Regional Soil Quality Standards.

2. *Potassium Levels*

Direct/Indirect Effects: Under this alternative approximately 166 acres of vegetation treatments would occur on the Pritchard geologic formation. Six of the proposed treatment areas (Units #1 through 6) occur on this geology. With the exception of Unit 6, some trees would be harvested from each of the units. Unit 6, which is 25 acres in size, would be manipulated through girdling and underburning and no trees or slash would be removed. Therefore, potassium levels would not be reduced in Unit 6. Over the remaining five proposed treatment units, which total 141 acres, some of the existing trees would be harvested and this would result in the loss of some potassium as a result of removing tree boles.

As previously mentioned, a study found that 45 percent of the potassium on a site is held in trees and approximately 86 percent of the potassium within the trees occurred in the branches, twigs and foliage (Garrison and Moore 1998). The remaining 14 percent was located in the tree bole. Therefore, approximately six percent of the potassium on a site might be held in tree boles. One mitigation measure associated with this alternative would require that the limbs and tops of the trees be removed prior to yarding them. This measure would result in most of the potassium that is located in the harvested trees being left on the site. 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. However, the average removal is probably less than 50%. Therefore, it could be expected that approximately three

percent (50% of the tree boles removed multiplied by six percent) of the potassium would be removed from these sites.

Research is not available to determine with any certainty what the effects of removing this small quantity of potassium might be on soil productivity and/or tree resistance to insects/diseases. However, past research has shown that certain tree species such as Douglas-fir and grand fir tend to take up or require more potassium then other species. In addition, Douglas-fir and grand fir are also more susceptible to root diseases than other species (Garrison and Moore 1998). Therefore, one could speculate that a small reduction in potassium might result in a small reduction of Douglas-fir and grand fir trees to be able to resist beetle attacks and/or root diseases. One of the objectives of the proposed research project is to test different silvicultural treatments that could be used to shift the tree species compositions towards more historic conditions. This would entail removing a higher percentage of the Douglas-fir and grand fir over the other species (such as white pine, western larch, ponderosa pine). Therefore, even if a three percent reduction in potassium were to make Douglas-fir and grand fir more susceptible to beetles/root diseases, the effects on tree mortality rates and productivity would likely be very small.

The aquatic and noxious weed improvement opportunities that are listed in Chapter 2 would occur if funding became available. If implemented, these activities would not affect the potassium levels.

Cumulative Effects: As previously explained in the existing condition section for potassium, past management activities have not reduced potassium levels in the analysis area. In addition, the ongoing and foreseeable future actions that were identified in the beginning of Chapter 3 would not occur in the soil analysis area and thus those actions would not have any effects on potassium levels. Therefore, the cumulative effects from implementing this alternative are the same as those described above under direct/indirect effects.

3.56 Consistency With The Forest Plan And Other Regulatory Direction

Both alternatives would meet all Forest Plan and Regional Soil Quality Standards Soil-disturbing management practices would maintain at least 85 percent of the activity area in a condition of acceptable productivity potential. Guidelines for the maintenance of adequate amounts of large adequate woody would be followed (Graham et al. 1994). IFTNC guidelines would assure the retention of the maximum amount of potassium on sites after treatments. In addition, the other design features and mitigation measures specified for soils in Chapter 2 would minimize effects to soil productivity.

3.6 Noxious Weeds

3.61 Affected Environment

3.61a 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 (USDA 1989)
- Priest Lake Ranger District Noxious Weed Control Project EIS (USDA 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 (USDA 1997). 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. (1992), 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.

3.61b Existing Condition

Information on current weed infestations and results of weed management in the project area is derived from observations during field surveys for Threatened, Endangered and sensitive plants.

Oxeye daisy (*Leucanthemum vulgare*), goatweed (*Hypericum perforatum)*, spotted knapweed (*Centaurea biebersteinii*) and meadow hawkweed (*Hieraceum pratense*) were found on Forest Roads S2, N7 and 597 G. No noxious weeds have been documented in proposed treatment units.

3.62 Environmental Consequences

3.62a Methodology

Effects of proposed actions on noxious weed spread are based on proposed fuels treatment, canopy removal, and soil and/or understory vegetation disturbance resulting from project activities and opportunities. The analysis of effects to noxious weeds of various activities relies on the following assumptions:

- Ground-based harvest carries the risk of weed spread through soil and understory vegetation disturbance. Skyline harvest systems cause less soil and understory vegetation disturbance.
- Free selection timber harvest would remove approximately 10 to 40 percent of existing tree canopy, allowing for increased understory vegetation growth, including some noxious weeds.
- Tree girdling would remove no trees from the treated unit, but would remove about 35% of existing canopy cover.
- Regeneration treatments (including group selection) remove 50% or more of the existing tree canopy, and would treat fuels with site preparation. This type of harvest carries a greater risk of weed spread than free selection harvest or tree girdling, particularly when in proximity to existing infestations.
- Units proposed for underburning would create understory vegetation and duff layer disturbance conducive to invasion by noxious weeds.
- Even in the absence of soil or vegetation disturbance, some weed species may invade if tree canopy cover is significantly reduced.

Cumulative effects analysis methodology is described below under the Cumulative Effects section.

3.62b Direct and Indirect Effects

Alternative 1

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 may occur, depending on District priorities and the availability of appropriated funding. Without treatment, seeds from weeds on Forest roads would likely continue to be transported out of the project area by vehicles, birds, and wildlife.

Alternative 2

There would be a risk of weed spread associated with road reconditioning. Implementation of design features for noxious weeds specified in Chapter II–2.5, Design Features for the Proposed Action, would greatly reduce the risk of weed spread (refer to the discussion of effectiveness of mitigation measures for noxious weed prevention, Chapter II-2.5, and the project file for supporting documentation).

There is a risk of weed spread from ground disturbing project activities. Preventive seeding of native and desired non-native species in disturbed areas 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 wash off-road harvest equipment prior to entry into the National Forest lands would further reduce the risk of weed spread. The risk of introduction and establishment of new weed invaders from project activities is expected to be low with implementation of the above measures.

Replacement of a large culvert over Canyon Creek (see Opportunites, Chapter II) would cause localized soil disturbance that would be susceptible to weed introduction and spread. Preventive measures such as cleaning of equipment to be used and monitoring following the disturbance (FSM 2080) would minimize the risk.

Weed treatment before ground disturbing activities, as proposed, would remove the majority of the seed source for weeds, which occurs mostly on roadsides, and would reduce the risk of weed spread within the project area.

3.62c Cumulative Effects

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

prisms of closed roads. However, the project area is adjacent to the proposed Wellner Cliffs RNA (pRNA). Open roads in the project area access most of the Priest River Experimental Forest; they also border the pRNA. Based on these considerations, the cumulative effects area for noxious weeds is considered to be the Priest River Experimental Forest.
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.

Cumulative effects were analyzed considering the following activities:

1. *Past Activities*

- **Timber harvest research activities**
- **Road construction**

Past activities have produced conditions conducive to weed introduction, by causing soil, vegetation and canopy disturbance and likely by transport of weed seeds into the area on soil moving equipment. Road construction also provided a corridor for weed spread by vehicles.

2. *Ongoing and Reasonably Foreseeable Actions*

Weed treatment and monitoring - weed treatment activities apart from those listed as Design Features for the Proposed Action (Chapter II-2.5) would be subject to available funding and District priorities. Any such activities would follow an Integrated Pest Management approach and may include biological, cultural, mechanical and chemical control methods. 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.

Timber stand improvement (tree planting and pre-commercial thinning in previously harvested units) - no increase in noxious weed spread is predicted from implementation of this activity, since little ground disturbance or significant canopy removal would occur.

Routine maintenance activities on open FS roads in the Experimental Forest, including brushing and blading – continued disturbance of roadsides from maintenance activities would increase the risk of weeds becoming introduced to these

areas.

Alternative 1

Cumulative effects would be expected to be low with regard to existing weed infestations and low with regard to new invaders. Implementation of the No Action alternative would not contribute new areas of soil disturbance conducive to weed spread. Existing weed infestations, especially those on currently closed road prisms, may or may not be treated, according to District priorities. There would be a potential for spread of these weeds to the adjacent proposed RNA. Weeds could also infest National Forest lands in the Experimental Forest from adjacent private lands.

Alternative 2

Under the proposed action, and considering past, ongoing and reasonably foreseeable actions, cumulative effects with regard to new invaders are expected to be low. Preventive measures, monitoring and treatment as proposed are predicted to reduce the risk of new invaders becoming established.

Cumulative effects with regard to existing weed infestations are expected to be low to moderate, considering ongoing and reasonably foreseeable actions as described above. Proposed prevention, monitoring and treatment measures would reduce, but not eliminate, the risk of weed spread in the project area. Risk of weed spread into the adjacent pRNA would be essentially the same as for Alternative 1. Weeds could also infest National Forest lands in the Experimental Forest from adjacent private lands.

3.62d Forest Plan Consistency

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

The Forest Plan in 1987 did not adequately address concerns for the effects of noxious weeds on forested ecosystems; nor did it anticipate the increase in weed program budgets over the last five years. The Forest Plan revision process being undertaken will address the issue of noxious weeds in an ecosystem context and in the light of advances in weed management technology and increased budget levels.

Appendix A

Introduction

The general objectives for conducting this research project were discussed in Chapter 1 of this environmental assessment. Listed below are more specific objectives and questions that would be researched with this proposed project. In addition, this appendix contains a discussion of the current condition of the timber stands that are proposed for treatment and additional information on the prescription that would be used to manipulate the vegetation.

Research objectives include:

- Determine what disturbances are feasible for growing, sustaining and restoring western white pine forest ecosystems that would contain a diversity of species including: large, mature western white pine, western red cedar, and western larch with a rich and diverse understory vegetation component.

- Evaluate restoration activities that maintain or enhance old forest structures and compositions.

- Develop restoration strategies (opening size, forest floor disturbances), that while maintaining high forest cover would protect forest floor (soils), enhance snag and down woody material for wildlife, enhance nutrient cycling and watershed processes (stream nutrition, flow, biotic components).

- Quantify the influences of the study on vegetation, soils, hydrology, and microsite disturbance.

- Collaborate with the Idaho Panhandle National Forests and the Priest Lake Ranger District to implement silvicultural systems for enhancing and sustaining old-forest structure and composition.

The primary research questions include:

Western white pine forest restoration

Given different stand conditions, what disturbances (biomass removal, forest floor disturbances, and young stand disturbances), intensity and timing are appropriate for regenerating and growing western white pine in small canopy openings?

What disturbances, intensity, and timing are appropriate for regeneration and growing of western redcedar?

What are the required disturbances and how are they implemented that create the appropriate conditions for western white pine and western redcedar regeneration on steep slopes?

What would be the time frame and vegetation response required to insure a future forest containing old large western white pine, while maintaining high forest cover?

Can management mimic small-scale historical disturbances (windstorms, ice storms) that created conditions for the regeneration of western white pine and western redcedar?

Can manipulations of stands containing old growth trees enhance their condition and structure?

What disturbances, intensity, and timing are appropriate for maintaining and growing large diameter ponderosa pine stands that contain old forest characteristics?

How do these disturbances relate to historical landscape patterns within the Canyon Creek drainage?

Watershed Processes

- How does the introduction of fire influence watershed processes (nutrient cycling, flow, sediment input)?
- Can mechanical treatments combined with controlled fire mimic historical post wildfire conditions (stand replacing)?
- What are the risks and benefits associated with these treatments?
- What is the change in Canyon Creek riparian vegetation, water chemistry, with the changes in species structure and composition of the upland slopes in the proposed treatment area over time?

Vegetation Treatment Prescriptions

Units #1, #3 and #8:

- Existing Stand Structure: One hundred to one hundred twenty year old western redcedar and western hemlock with diameters ranging from 8 to 14 inches with dense suppressed western hemlock beneath western redcedar. There are minor amounts of western white pine, grand fir, Douglas fir, and scattered ponderosa pine with minimum amounts of forbs and shrubs.
- Prescription: Free selection is a hybrid of uneven-aged silviculture that combines single tree and group selection methods for regenerating shade-intolerant

species (Nyland 1996). To insure natural regeneration of western white pine occurs a minimum of 40% canopy opening is suggested (Jain 2001); therefore, small openings (less than .25 acres) within the overstory would be created to favor the regeneration and establishment of western white pine. These openings would be placed in areas that have substantial mortality in the overstory. Surrounding the openings, individual western redcedar and western white pine and hemlock that have the potential to respond to release and to become old and large would be favored. Residual overstory density would be 40-65%. In many cases, clumps (cohorts) of trees would remain. Any area that would support regeneration would be planted with blister rust resistant western white pine, western redcedar, and western larch to insure they are present and can develop into the future mature overstory. Biomass must be removed (through commercial harvest) to lessen the fuel loadings and insure that subsequent residual overstory, shrubs, forbs, and newly regenerated vegetation is protected during the planned jackpot burning that would occur.

Figure A-1. Photo of a portion of proposed Unit #8.This stand structure and composition is typical of that which occurs in Units 1, 3 and 8.

Unit #2:

- Existing Structure: The area contains some scattered, large old relic ponderosa

pine; western larch and Douglas fir. Most of the stand is composed of 110-120 year old grand fir, Douglas-fir and ponderosa pine. The intermediate smaller diameter ponderosa pine needs to be thinned and released to insure they continue to develop into large trees. Douglas fir is within concentrated groups through out the stand and is competing with the more resilient ponderosa pine. Root disease exists in the stand, causing mortality to the Douglas-fir.

- Prescription: The objective is to determine what silvicultural options could be used to manage, maintain or enhance ponderosa pine old forest structure. Under historical conditions, fire would have thinned some of the ponderosa pine at a younger age, however because of fire exclusion, these trees are too large to be naturally thinned with fire. Therefore, a conservative individual tree selection method would be primarily used to remove immediate competitors from dominant ponderosa pine and western larch would be the objective. However, there may be situations where very small groups of trees would be removed and because of this, the treatment for the whole unit was called free selection rather than individual tree. Openings that would be created would be less than ¼ acre in size. Tree removal would include the removal of small diameter Douglas fir within the intermediate canopy, along with irregular thinning within the younger even aged ponderosa stands. The objective is to grow and maintain a stand with large diameter ponderosa pine with a minor component of Douglas fir and western larch. Fire would be used for both maintenance and to remove competitors, along with promoting the natural regeneration of ponderosa pine.

Units #5 and #12:

- Existing Structure: The area consists of mixed stands of 120-year-old western hemlock, grand fir, Douglas fir, scattered western white pine and western larch. A variety of disturbances (root disease, mistletoe, stem disease, blister rust) are occurring within this stand. Under historical conditions, much of the area would contain a plurality of western white pine that would dominate the stand for up to 250 years and would be more resilient to these native disturbances. However, because western white pine has largely been eliminated from the stands because of blister rust, western hemlock, western redcedar, Douglas-fir, and grand fir now dominate the stand. These species are not resistant to many of the native disturbances (Steele 1994). Rather the disturbances that maintained these stands in the past are now creating a more homogeneous and suppressed multi-story stand of old small trees that would not achieve old forest structure (Haig et al. 1941, Graham 1982, Jain 2001). Closed canopy conditions create a bare understory with no forbs or shrubs. Only in areas where ice storms or windstorms or root disease has occurred (less then 10 acre) is there any understory vegetation. Most of these areas have thick stagnant western hemlock regeneration that would not respond to release and thus would not develop into old large trees (Graham 1982).

- Prescription: A typical prescription for this stand would be to regenerate the area

using clearcut methods. As an alternative, group and free selection methods would be applied to increase the abundance of western white pine. Groups would range in size between ¼ to 1 acre in size and would be concentrated in areas that are experiencing high amounts of mortality. Interspersed between the groups, free selection would be applied. Species that would be favored would include western redcedar, relic western white pine, ponderosa pine, Douglas fir, and healthy western larch. Trees would be removed using cable and ground-based systems. Within the groups, jackpot burning would be conducted prior to planting western white pine. Within the free selection, some interplanting of western redcedar and in some cases depending on canopy opening (> 40%), western white pine would occur.

Figure A-2. Photo of a portion of the proposed Unit #12. The stand structure and composition depicted in this photo is typical of most of Units #5 and #12.

Units #4, #9, and a portion of #11 and #13 (the non-old growth portion):

- Existing Structures: With the exception of the portion of Unit #11 and a portion of Unit #13 that meet old growth criteria, the stands that occur within these proposed units consist of highly diseased overstory and suppressed understory trees. Thus limiting our options for maintaining a sustainable stand in its current condition. Species consist of mistletoe infected western larch, and 100-120 year old western redcedar and western hemlock. Many of these trees have less then 10% crown, which have been shown not to release after treatments (Graham 1981,1982).

- Prescription : The objective is to enhance the sustainability of these stands by introducing western white pine and creating conditions that may favor better growth from young western redcedar. Most often when these current conditions exist, clearcutting is the preferred alternative. However, other options would be investigated in this study. Approximately 20% of the area within the units would be harvested with a strip shelterwood system and 60% of the area in the units would be harvested with a free selection system. About 20% of the area within the units would not have a treatment applied. In the strip shelterwood areas, the residual canopy cover would be approximately 20%. In these areas, western white pine would be planted along with western redcedar and appropriate tending would be conducted to insure that these trees reach maturity. Immediately surrounding the strip shelterwood areas, free selection would be applied with residual canopy cover ranging from 25% to 60%. There would be acres in these units between strips that are not treated at all. The free selection would result in a diverse structure of canopy covers and may create small openings (< ¼ acre). In the free selection vigorous western hemlock, western redcedar, ponderosa pine and other healthy vigorous trees of any species would be favored. Crown ratios would need to exceed 50% to insure that residual overstory trees have the greatest chance for survival and potentially can continue to mature to old forest status (> 500 years). Site preparation (jackpot burning and some grapple piling) would occur within the strips and small openings. Western white pine and western redcedar would be planted.

Figure A-3. Photo showing a portion of proposed Unit #11 (stand # 857-2-77) that is dominated by second growth trees (approximately 110 yrs old).

Unit #6:

- Existing Structure: A long-term study (Luce unpublished) is being established to quantify the influence of stand replacing fires on hydrologic processes. A paired watershed study has been implemented on the Experimental Forest and has been monitored for five years. A silvicultural treatment that mimics a stand replacing wildfire would be applied on one watershed (Unit 6). The stand is approximately 120 yrs old.

- Prescription: Conditions that would encourage a stand replacing wildfire cannot be accomplished and simultaneously protect the surrounding area without substantial risk. The objective is to mimic the effects from a stand replacing fire by girdling a portion of the overstory and then apply a prescribed surface fire. No biomass would be removed from the treated watershed. The resulting structure would consist of standing dead and some live overstory trees. Ecosystem components (soils, sediment, flow, vegetation) before and after treatments are applied would be quantified. Results from this study would be paired with the control watershed (Unit #7).

Unit #10 and portions of Units #11 and #13 (the portions that meets old growth criteria):

- Existing Structure: These areas are dominated by western redcedar and western hemlock. Smaller amounts of grand fir, western larch, and western white pine also are present. Stands within Unit #10 do not meet old growth criteria but there are some scattered old relic cedars. Most of the larger trees within Unit #10 are 110-120 years old. Portions of Units #11 and #13 have enough of these old growth trees to meet the criteria for old growth stands**.** Approximately 6 acres in Unit #13 and 18 acres in Unit #11 occur within old growth stands (stands 857-2-68,71,73,76).
- Prescription: The objective is to determine what silvicultural options could be used to manage old forest structures. The free selection treatment would be applied to the old growth portion of these units. The slash would be jackpot burned and these areas would be logged using the skyline yarding system. One main reason for manipulating these stands is to conduct research into how the treatment would affect their old growth characteristics. The treatment within these areas would retain the larger, old growth trees while removing a portion of the younger trees (trees less than 120 years old). The canopy cover within these treatment areas would be retained at 60% or greater following the activities. Following the treatments, these areas would still meet the old growth criteria.

Figure A-4. Photo showing a portion of Unit #10 (stand 857-2-77).

Figure A-5. Photo showing a portion of proposed Unit #11 (stand # 857-2-76) that meets old growth criteria and has a mix of old growth trees and second growth trees.

Appendix B

Introduction

The following transportation appendix is divided into two main sections. The first section is titled the "Road Analysis Process" and it contains a summary of the process that was followed and the ID Teams findings regarding the existing transportation facilities in the area and whether or not the roads are currently meeting our needs and objectives. Through this road analysis process, the ID Team developed some recommendations for potential changes that could be implemented in the area.

The second section of this appendix is called the "Transportation Plan" and it includes a list and description of the specific road related activities that are being proposed for Alternative 2 (the proposed action).

Road Analysis Process

As mentioned in Chapter 2 of this EA, the ID Team working on this project conducted an analysis of the roads within the project area. The Road Analysis Process (RAP) that was used is discussed in detail in the publication "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System" (USDA 1999, Misc. Rep. FS-643). By following the six-step analysis process outlined in that publication, the new transportation analysis rules (36 CFR part 212) and Forest Service directives were met. In this section of this appendix, a summary of the process that was followed and the recommendations that were generated from the analysis are presented. The project file contains other documents that are also part of the analysis.

Scope of Road Analysis

The geographic scope of this roads analysis is limited to the Canyon Creek Research project area and the roads that lead into or out of this area. This project area is located within the Priest River Experimental Forest. Researchers and managers from the Rocky Mountain Research Station (RMRS) worked with employees from the Idaho Panhandle National Forests in the development of this roads analysis.

The objectives of the analysis were to:

- Determine the condition of existing roads in the analysis area
- Determine if the current transportation system is adequate to meet research needs
- Identify risks to resources from the existing roads
- Identify management opportunities to address research needs or resource risks
- Determine whether new roads are needed.
- Determine whether existing roads are needed.

The most important road related issues that were identified for this analysis were:

- Access needs for research goals and objectives
- Access to state or private lands
- Road effects on water, fisheries, and wildlife

General Description of Existing Transportation System

The existing road system within the Priest River Experimental Forest has been developed over the last 91 years. The earliest roads were constructed in 1911 and the most recent occurred in 1975.

The first collector roads were built in 1911 and from 1922 to 1924. These were constructed to access the Headquarters station, a small dam that provided water for the station, and a gauging station. Although it is no longer used, an old wooden water pipe still runs under road 597A. In the 30s, the Civilian Conservation Corp (CCC) began construction on a system of collector roads to access the higher elevations to the north and south of Benton Creek. These were constructed for research and fire protection. More specifically, the 597C road was built to Ida Creek Point Look Out and the head of Canyon Creek. The 597B road was constructed to the Gisborne Mountain Look Out.

From 1949 to 1951, two more collector roads were constructed into the Canyon Creek drainage. Road 597D loops around Ida Creek Point and ties back into 597C. Road 597Q1, which is now 597G, provided access directly to Canyon Creek. In 1964, 597G was extended across Canyon Creek and to the east where it ties back into 597C at the head of Canyon Creek. These roads make up the bulk of the collector system for the forest. Over the years, a system of local spur roads off of these roads to access areas for research based timber harvest and other studies. These roads tend to parallel each other along the contours of the slope and were generally built to a low standard and spaced fairly close together. The common cable yarding system of the 1950s and 1960s was the Idaho Jammer and because of it's very limited capabilities, roads had to be spaced close together.

The collector roads are fairly well maintained and kept open to traffic. However, many of the local roads are completely brushed closed and are impassible to motor vehicles. Surfacing on the majority of the roads is of native material with some spot pit run aggregate. Much of the native material is composed of belt series rock, which tends to be more stable and less erodible. However, there are some areas in the lower reaches of Benton Creek that have lacustrine soils, which tend to be unstable when wet and prone to slumping. These areas are generally surfaced with pit run aggregate. Existing drainage structures are fairly old and some are beginning to show signs of rust or are undersized.

The project site lies within an area designated in the Forest Plan as Management Area 14. These areas are to be utilized for scientific research. Although providing recreation is not a primary objective of this area, some of these roads do provide access for recreational opportunities such as hunting and berry picking. Firewood cutting is not permitted within the experimental forest. Today, many of these roads continue to provide access for researchers conducting scientific studies related to silviculture and other research.

Some of these roads also provide access to adjacent private and state land as well as National Forest lands. Access for fire suppression is another important function of the road system. Table B-1 describes the current condition of roads within the project area.

Adequacy of Current Transportation System for Research Goals and Objectives

Researchers and managers from RMRS reviewed their short and long-term research goals and objectives for the area and discussed this with the other members of the IDT. The following summarizes the conclusions from that review.

Existing roads are adequate (with continued retention maintenance) for research access and to provide access to private and state lands. No new roads are needed. Access for fire suppression is adequate. However, some existing roads that are brushed closed need to be opened up and improved for access (restoration maintenance) for use in this research project and future ones. Depending on the specific road and whether or not the road would be needed again (and when it would be needed), one of the following three scenarios would occur: (1) A road may be opened up to provide access for short-term research needs and after their use, they would be put into storage if they are needed again in the future; (2) The road could be opened up for short-term research needs and if it were not needed again, it would be decommissioned and removed from the system; (3) The third possibility is if the road were opened up and left open to provide current access needs as well as future ones. Roads that are currently brushed closed but are not needed now for access would remain brushed closed and put on the system as classified roads.

Culverts on the roads opened up for access could be maintained or replaced and culverts could be added if needed to correct drainage problems. Culverts on roads within the project area that would remain brushed closed would need maintenance checks to reduce the risk of failures.
Some sections of roads could be decommissioned, as they are not necessary for either short or long-term research goals.

Opportunities to Reduce Risks to Water Quality and Fish Habitat

During the development of this Road Analysis, the impact of the road system on water quality and fish habitat was identified as an important issue. Canyon Creek flows into the Middle Fork of the East River. Because the Middle Fork is a 303d listed stream segment, there is an elevated concern over how the road system may contribute to sedimentation (or the risk of it) of Canyon Creek and in turn the Middle Fork.

In addition, Canyon Creek supports the sensitive Cutthroat Trout species and tributaries to the Middle Fork contain the threatened bull trout. For these reasons, one of the primary focuses of the road analysis was to identify risks that the transportation system posed on aquatic resources and opportunities to reduce those risks.

The existence of roads can increase sediment and water yields from overland flows. Any reduction in road density can provide positive benefits to fisheries and watersheds. As previously discussed, road densities are fairly high within the project area and the RMRS has determined that the amount of roads is higher than needed to meet short and long-term research goals and

objectives therefore, the opportunity exists to reduce road density by decommissioning some roads.

There are approximately 147 culverts on roads being analyzed (94 of these culverts are not within the analysis area for the Canyon Creek Research Project and 62 culverts are on road segments with planned activities). Some of these culverts are old and showing signs of deterioration. Some are undersized making them inadequate to handle peak stream flows or they are more susceptible to plugging with debris. During the last commercial timber sale, PREF Rehab, some of the culverts on these roads were replaced and some culverts were added. Aggregate surfacing, ditch armor and surface water deflectors, such as water bars and open tops, were also added or improved to help reduce erosion. There are existing culverts on brushed closed roads that are hard to maintain because of the poor access. Because of this, these culverts have a higher risk of failure.

Opportunities to Address Wildlife Security

In a response to a Scoping Notice sent out for the Canyon Creek Research Project, the Idaho Department of Fish and Game recommended that the Forest Service maintain or reduce existing levels of motorized access. They suggested that road closure opportunities be considered. To respond to this request, all of the roads in the analysis area were reviewed to determine if they were needed for future access. In addition, on roads that are currently brushed closed but are needed for the Canyon Creek Research Project, the recommendation was made to gate these roads, once they have been opened up, to minimize motorized access on them.

Table B-1. All of the existing roads in the analysis area, their current condition, use, maintenance level, resource risk and the ID Team's recommendation on future management of the roads.

Road	Length* miles (**)	Current Condition	Current Use level/ Maintenance level	Current Use & Management	Resource risks	Recommendations
597A	1.8	Open	Moderate / 2	Classified road. Primary access into experimental forest and Headquarters station. Retention maintenance was done under the PREF Rehab TS in 2000. Replaced 7 and added 9 culverts and added surfacing. Needed for long-term access.	26 existing culverts with one crossing of Benton Creek. Parallels Benton Creek on north side. Catch basins for 2 or 3 of the new culverts have slumped.	Keep on system as classified road at ML2. Perform retention maintenance. Armor slumped culvert catch basins.
597A3	1.3	Brushed closed	None	Unclassified. Need for future access is unknown at this time.	The majority of this road is in the Benton Creek drainage. Midslope road with fairly gentle side slopes except near the head of Benton Creek. 2 culverts, one crosses head of Benton Creek. Both are outside the project area. Accesses proposed control unit 7 but will not be opened.	Remain as unclassified until the required Roads Analysis is completed for the Benton Creek drainage. Maintain culverts.
597C	2.4 (5.8)	Open	Low / 2	Classified road. Primary access to Ida Creek Point and the head of Canyon Creek. Retention maintenance was done up to the saddle under the PREF Rehab TS in 2000. Upsized and realigned 2 culverts to fit creek at switchback and added culverts and surfacing. Needed for long-term access.	Parallels Ernest Gulch up to saddle with 2 creek crossings at switchback, then runs midslope on north face of center ridge to head of Canyon Creek. Spring in road causing drainage problems. Accesses planned units.	Keep on system as classified road at ML2. Perform retention maintenance and fix drainage problem. Will also need to improve a loaded truck turnaround at junction with road 597M4.
597C1	(0.30)	Open	Low	Unclassified road built in 1975. Recently brushed open. Good condition. Needed for future research access.	A short, ridge top road with gentle side slope. Low risk. 1 culvert. Does not access proposed units.	Put on system as classified road at ML1.

Road	Length* miles (**)	Current Condition	Current Use level/ Maintenance level	Current Use & Management	Resource risks	Recommendations
597D	2.7 (3.1)	Open	Low / 2	Classified road. Main collector around north face of center ridge connecting 597A and 597C. Provides access to state and private lands in sec 22 & 23. Retention maintenance done under the PREF Rehab TS in 2000 up to junction with O3 road. Replaced culvert at Pricilla Gulch and added culverts and surfacing. Needed for long-term access.	Minor drainage problems. 4 culverts. Existing culvert in Ida Creek is undersized. Accesses planned units	Keep on system as classified road at ML2. Perform retention maintenance and fix drainage problems and upsize culvert in Ida Creek.
597D1	1.9	Brushed closed	None	Unclassified. Portions are needed for future research access.	Midslope road with 4 existing culverts. One 36" culvert was removed in draw between planned units 9 & 10. This culvert would have a high risk of failure if not maintained. Many wet areas. Accesses planned units. Sensitive plants.	Perform restoration maintenance. Stabilize wet areas. Install 36" culvert for this activity, then pull. Decommission small section of road past unit 10 and put in storage from draw with 36" culvert. Put on system as classified road at ML1. Gated at junction with 597D.
597G	1.4 (8.5)	Open	Low / 2	Classified road. Provides access to state and private lands in sec 22 & 23. Retention maintenance done under the PREF Rehab TS in 2000 up to Ida Creek. Needed for long-term access.	Road continues down into and crosses Canyon Creek. This existing crossing is a fish barrier and the existing culvert is undersized with high potential for failure. 33 other culverts. Accesses planned units.	Keep on system as classified road at ML2. Perform restoration maintenance. The crossing at Canyon creek should be upgraded using appropriated or KV funds.

Road	Length* miles (**)	Current Condition	Current Use level/ Maintenance level	Current Use & Management	Resource risks	Recommendations
597H9	0.5	Open	Low/1	Unclassified road. Provides access through an old clear-cut unit into an existing gravel pit. Restoration maintenance was done under the PREF Rehab TS in 2000 to provide access for pit run aggregate. PREF and district maintenance occasionally uses the pit. Needed for long-term access.	Road is on flat stable ground. Provides a close source of fairly good pit run aggregate.	Put on system as a classified road at ML1.
597M2	0.4 (2.7)	Open	Low / 2	Classified road. Needed for long-term access.	Midslope road running south from 597C and crossing the head of Benton Creek then tying into 597B. All 7 culverts are outside of project area. Only first 0.4 miles needed to access proposed units.	Perform retention maintenance. Keep on system as classified road at ML2.
597M4	(0.60)	Open	Low	Unclassified road. Open for research. Junction with 597C at Observatory Point. Needed for future access.	Short midslope road above 597C. A loaded truck turnaround is needed at the junction with 597C for trucks coming off of 597M2. 3 culverts.	Put on system as classified road at ML1. Improve junction with 597C for a loaded truck turn around. Maintain culverts.
597M7	(1.10)	Open	Low	Unclassified road. Open for research. Observatory Point access. Needed for future access.	Midslope road above 597C. Does not access proposed units. 10 culverts, 2 in perennial streams.	Put on system as classified road at ML1. Maintain culverts.
597N4	(0.60)	Brushed closed	None	Unclassified. Need for future access is unknown at this time.	The majority of this road is in the Benton Creek drainage. Midslope road with fairly flat side slopes. 1 existing culverts crosses upper end of Ernest Gulch. Does not access proposed units.	Remain as unclassified until the required Roads Analysis is completed for the Benton Creek drainage. Maintain culvert.

Road	Length* miles (**)	Current Condition	Current Use level/ Maintenance level	Current Use & Management	Resource risks	Recommendations
597N5	(0.60)	Brushed closed	None	Unclassified. Need for future access is unknown at this time.	The majority of this road is in the Benton Creek drainage. Midslope road with fairly flat side slopes. 2 existing culverts. 1 crosses upper end of Ernest Gulch. Does not access proposed units.	Remain as unclassified until the required Roads Analysis is completed for the Benton Creek drainage. Maintain culverts.
597N7	(1.3)	Brushed closed	None	Unclassified. Need for future access is unknown at this time.	The majority of this road is in the Benton Creek drainage. Midslope road that runs south off of 597C into the head of Benton Creek. 7 existing culverts. Gentle side slopes until it crosses the ridge into Benton Creek. Runs through the middle of proposed control unit 7 but is not to be opened.	Remain as unclassified until the required Roads Analysis is completed for the Benton Creek drainage. Maintain culverts.
597O4	(0.3)	Open	Low	Unclassified. Used for access with the PREF Rehab TS in 2000. Accesses Ida Creek Point. Needed for future access.	This is a ridge top road with no culverts. Access to top of proposed units 5 & 6, but will not be used.	Put on system as classified road at ML1. Put in storage.
597O7	(0.4)	Brushed closed	None	Unclassified road built in 1953, runs from 597O4 to 597D at the head of Ida Creek. Not needed for future access.	Mostly ridge top/saddle road with flat side slopes. A portion runs parallel to an ephemeral draw. No culverts. Runs through proposed watershed study unit 6, but will not be opened. Field survey by Dan Frigard indicates that the road is hydrologically inert.	Decommission. This will not involve any on the ground work, since this road has no culverts, is hydrologically inert and brushed closed. Just remove the road number from the system.

Road	Length* miles (**)	Current Condition	Current Use level/ Maintenance level	Current Use & Management	Resource risks	Recommendations
597Q2	2.8	Brushed closed	None	Unclassified. A portion needed for future access.	Runs east off of 597D mid slope above Canyon Creek. 8 existing culverts with high risk of failure if not maintained. Provides access to proposed unit 4. Not needed past draw in middle of unit 4.	Open with restoration maintenance up to draw in middle of unit 4. Replace 1 deteriorating culvert. Decommission road and pull 5 culverts past that point. Gate road at junction with 597D. Put on system as classified at ML1.
597Q3	1.6	Brushed closed	None	Unclassified. Needed for future access.	Runs east off of 597D mid slope above Canyon Creek. 2 existing culverts with high risk of failure if not maintained. Provides access to proposed unit 4.	Open with restoration maintenance up to last draw past unit 4. Decommission and pull culvert past unit 4. Put the rest of the road in storage after planned activities and pull culvert. Put on system as classified road at ML1. Earthen barrier near junction with 597D.
597Q11	(0.6)	Brushed closed	Low	Unclassified. Used by researchers to access plantation for cone collection. Needed for future access.	Runs at the bottom of the slope next to fairly flat ground. Runs through proposed unit 1 but will not be opened.	Put on system as classified road at ML1. Remain in storage.
597S2	1.2	Brushed closed	None	Unclassified. A portion needed for future access.	Mid slope road off of 597C above Canyon Creek. 6 existing culverts at risk of failure if not maintained. 1 completely deteriorated. Many springs and drainage problems. Access to proposed units 9 & 11. Access by vehicle past unit 11 no longer needed.	Open with restoration maintenance through unit 11. Replace deteriorated culvert. Repair drainage problems and add culverts as needed for springs. Decommission road past unit 11 and pull culverts. Put road into storage from unit 9 through unit 12 and pull culverts. Put road on system as classified at ML1. Gate at junction with 597C.
597S3	0.6	Brushed closed	None	Unclassified. No longer needed.	Mid slope road off of 597C above Canyon Creek. 1 culvert. Access by vehicle into the area no longer needed.	Decommission and pull culvert.

Length* - Road length needed for access or to be treated with this project. (**) – Total road length.

Transportation Plan

As previously mentioned, the road analysis process that was followed resulted in the development of specific recommendations on the management of all the roads within the project area. Those recommendations are documented above in table B-1. All of those recommendations were adopted and incorporated into the design of the proposed action. For each road, the following table B-2 lists the specific roadwork that would be conducted with the proposed action (Alternative 2). Some roads listed in the table are broken into multiple segments because different types of work would be conducted on the various road segments.

Table B-3 presents a summary of the road treatment that is being prescribed for each road and the total mileage of each treatment type. Table B-4 presents some additional information on how many culverts would be removed under the proposed action and a summary of the proposed road treatments for roads that are currently open and those that are closed. Some of these tables contain abbreviations for the road treatments as well as other technical road management terminology. Definitions for these treatments and road terms are presented at the end of this transportation section. Road management objectives for each of the roads in the analysis area are located within the project file.

Table B-2-							
Road No.	Length (miles)	Current Condition	Current Category* & M/L**	Planned Activity***	Planned Category & M/L	Closure	Description of work involved in Planned Activity
597A	1.8	Open	Classified - 2	R1M	Classified - 2		Reconditioning and spot work to armor 2-3 catch basins
597C	1.0	Open	Classified - 2	R1M	Classified - 2		Reconditioning. An existing side barrow source at MP 0.25 may be used for ditch armor and slope protection rock.
597C	1.4	Open	Classified - 2	R2M	Classified - 2		Reconditioning, brushing, culvert removal & install, drainage excavation, aggregate surfacing, geosynthetics and riprap to repair spring in road, improve loaded truck turnaround.
597C	3.4	Open	Classified - 2	None	Classified - 2		None
597D	0.9	Open	Classified - 2	R1M	Classified - 2		Reconditioning
597D	1.8	Open	Classified - 2	R2M	Classified - 2		Reconditioning, brushing, culvert removal & install, drainage excavation, aggregate surfacing
597D	0.4	Open	Classified - 2	None	Classified - 2		None
597D1	1.8	Brushed closed	Unclassified	R2M (Includes 0.4 miles to be put into storage)	Classified - 1	Gated	Reconditioning, clear & grub, culvert removal & install, drainage excavation, aggregate surfacing
597D1	0.4	Brushed closed	Unclassified	Storage after activities, east unit 9 thru 10	Classified - 1	Earthen barrier or recontour 100'-200'	Purchaser storage.
597D1	0.1	Brushed closed	Unclassified	Decommission past unit 10	Unclassified	Earthen barrier or recontour 100'–200'	Appropriated or KV Decommission to be done prior to Purchaser storage.
597G	0.9	Open	Classified - 2	R1M	Classified - 2		Reconditioning
597G	0.5	Open	Classified - 2	R2M	Classified - 2		Reconditioning, brushing, drainage excavation, aggregate surfacing
597G	7.1	Open	Classified - 2	None	Classified - 2		None

Road No.	Length (miles)	Current Condition	Current Category* & M/L**	Planned Activity***	Planned Category & M/L	Closure	Description of work involved in Planned Activity
597M2	0.4	Open	Classified - 2	R1M	Classified - 2		Reconditioning
597M2	2.3	Open	Classified - 2	None	Classified - 2		None
597Q2	1.9	Brushed closed	Unclassified	R2M (Includes 0.1 miles to be decommissioned)	Classified - 1	Gated	Reconditioning, brushing, culvert removal & install, drainage excavation, aggregate surfacing
597Q2	1.0	Brushed closed	Unclassified	Decommission mid unit 4 to end	Unclassified	Earthen barrier or recontour 100'-200'	Appropriated or KV Decommission.
597Q3	1.3	Brushed closed	Unclassified	R2M then put in Storage after activities	Classified - 1	Guard rail Barrier	Reconditioning, clear & grub, drainage excavation, aggregate surfacing. Purchaser Storage.
597Q3	0.3	Brushed closed	Unclassified	Decommission past unit 4	Unclassified	Earthen barrier or recontour 100'-200'	Appropriated or KV Decommission to be done prior to Purchaser storage.
597S2	0.7	Brushed Closed	Unclassified	R2M (Includes 0.3 miles to be put into storage)	Classified –1	Gated	Reconditioning, clear and grub, install temporary culvert in section to be put into storage after activities, drainage excavation, aggregate surfacing
597S2	0.3	Brushed Closed	Unclassified	Storage after activities, east unit 9 thru 11	Classified –1	Earthen barrier or recontour 100'-200'	Purchaser storage.
597S2	0.5	Brushed closed	Unclassified	Decommission past unit 11	Unclassified	Earthen barrier or recontour 100'-200'	Appropriated or KV decommissioned to be done prior to purchaser storage.
597S2	0.6	Brushed Closed	Unclassified	Not used, decommission	Unclassified	Earthen barrier or recontour 100'-200'	Appropriated or KV decommission.

Table B-3										
Road #	**Total length**	**Retention-** road would be left open	**Restoration-** road would be left open	**Restoration then storage**	**Restoration then decommission**	**Total Restoration**	**Storage**	**Decommission**	**Work length**	**No work**
597A	***1.80***	***1.80***				***0.00***			***1.80***	***0.00***
A3	1.30					0.00			0.00	1.30
597C	***5.80***	***1.00***	***1.40***			***1.40***			***2.40***	***3.40***
597C1	0.30					0.00			0.00	0.30
597D	***3.10***	***0.90***	***1.80***			***1.80***			***2.70***	***0.40***
597D1	***1.90***		***1.40***	***0.40***		***1.80***	***0.40***	***0.10***	***1.90***	***0.00***
597H9	***0.50***					0.00			0.00	0.50
597G (Q1)	***8.50***	***0.90***	***0.50***			***0.50***			***1.40***	***7.10***
597M2	***2.70***	***0.40***				***0.00***			***0.40***	***2.30***
597M4	0.60					0.00			0.00	0.60
597M7	1.10					0.00			0.00	1.10
597N4	0.60					0.00			0.00	0.60
597N5	0.60					0.00			0.00	0.60
597N7	1.30					0.00			0.00	1.30
597O4	0.30					0.00			0.00	0.30
597O7	0.40					0.00			0.00	0.40
597Q2	***2.80***		***1.80***		***0.10***	***1.90***		***1.00***	***2.80***	***0.00***
597Q3	***1.60***			***1.30***		***1.30***	***1.30***	***0.30***	***1.60***	***0.00***
597Q11	0.60					0.00			0.00	0.60
597S2	***1.20***		***0.40***	***0.30***		***0.70***	***0.30***	***0.50***	***1.20***	***0.00***
597S3	***0.60***					***0.00***		***0.60***	***0.60***	***0.00***
Column Totals	37.60	5.00	7.30	2.00	0.10	9.40	2.00	2.50	16.80	20.80

*miles rounded up to 1 decimal

Table B-4 Miles of Road by Planned Activity (**Total road miles –16.8)

R1M Currently open	R2M Currently open	R2M Currently brushed closed*	Decommission Currently open (# of culverts pulled)	Decommission Currently brushed closed (# of culverts pulled)	Storage Currently open (# of culverts pulled)	Storage Currently brushed closed (# of culverts pulled)
5.0	3.7	5.7	0	2.5(10)	0	2.0(4)

*All existing roads, currently brushed closed, that will be opened for activities will have road closure devices installed with yearlong closures.

**The total "Miles of Road by Planned Activity" is 18.9 miles however, this includes 2.1 miles of road that will be opened with restoration maintenance (R2M) for this project then closed by decommissioning or put into storage. The total road miles with planned activities is 16.8.

Definitions

***Category:**

36 CFR 212.1, Administration of the Forest Development Transportation System and FSM 7700 - Forest Transportation System part 7705 defines *roads* as one of the following:

a. *Classified Roads*. Roads wholly or partially within or adjacent to National Forest lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.

b. *Temporary Roads.* Roads authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management.

c. *Unclassified Roads.* Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail: and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.

***M/L, Maintenance Level:**

Level 1 - This level is assigned to intermittent service roads during the time management direction requires that the road be Closed or otherwise blocked to traffic. Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level. Drainage facilities and runoff patterns are maintained.

Level 2 - This level is assigned where management direction requires that the road be open for limited passage of traffic. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Vehicles are limited to high clearance.

Level 3 - This level is assigned where management direction requires that the road be open and maintained for safe travel by a prudent driver in a passenger car. Traffic volumes are minor to moderate; however, user comfort and convenience is not considered a priority. Generally, the traveled way surface is not smooth.

Level 4 - This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate speeds. Traffic volumes are normally sufficient to require a double lane aggregate surfaced road. Some roads may be single lane and may be paved and/or dust abated. The functional classification of these roads is normally collector or minor arterial.

Level 5 - This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience. These roads are normally double lane, paved. Some may be aggregate surfaced and dust abated. Functional classification of these roads is normally arterial.

*** ***Planned Activity:*** Reference 36 CFR 212.1, Administration of the Forest Development Transportation System and FSM 7700 - Forest Transportation System.

R1M: Retention Maintenance - Retention Maintenance is the ongoing upkeep of a road necessary to *retain* the road at the approved road management level. For this planned activity it involves any work within the road Right-of-way that is needed to meet the assigned maintenance level, provide for user safety, provide adequate drainage and to establish a condition at which the road can be maintained or brought back to upon completion of the activity. This work is generally minor in nature and may include ***reconditioning***; blading to remove ruts, potholes and reestablish in/out slope, cleaning existing ditches, catch basins, culvert inlets and outlets, removing or maintaining berms, and removal of minor slide material (less than 100 cubic yards). Other work may include cleaning other drainage structures such as open tops, cleaning bridge decks, roadway brushing, and installing or replacing traffic safety signing and object markers. Minor spot work may be required such as placing rock to armor a culvert catch basin, outlet or fill slope, or aggregate surfacing to fill or stabilize a low wet spot. Dust abatement may also be specified.

R2M: Restoration Maintenance - Restoration Maintenance is the ongoing upkeep of a road necessary to *restore* the road to the approved road management level. For this planned activity it involves any work within the road Right-of-way that is needed to open up the road, repair damage, improve drainage, stabilize the roadway, or provide for user safety at its assigned maintenance level. This may include much of the same work associated with Retention Maintenance; however, because of the existing condition of the road, the amount of work needed to open the road back up or because of specific deficiencies or opportunities for improvement within the road Right-of-way, the work may also include clearing and grubbing, excavation and embankment, removal and/or installation of culverts and other drainage structures, drainage excavation such as rolling dips, catch basins and ditches, installation of geosynthetics, placement of ditch protection armor and rip rap, aggregate surfacing, dust abatement and road closure devices. Newly exposed soils would be seeded and fertilized and in some cases have straw mulch applied.

Decommissioning - Decommissioning is the activity that results in the stabilization and restoration of unneeded roads to a more natural state. Decommissioning of unneeded roads includes applying various treatments, which may include one or more of the following:
a. Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;
b. Blocking the entrance to a road by earthen barrier or recontouring the 1st 100' – 200'; installing water bars;
c. Removing culverts, reestablishing drainage-ways, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed;
d. Completely eliminating the roadbed by restoring natural contours and slopes; or
e. Other methods designed to meet the specific conditions associated with the unneeded road.
Decommissioned roads are removed from the Forest Transportation System.

Storage - Storage is the activity that results in the stabilization or restoration of classified roads to a more natural state until the road is again needed to accomplish a management activities. Storage may include one or more of the treatments described under decommissioning. The road would be effectively blocked by earthen barrier or guardrail barrier while in storage or have the 1st 100' – 200' recontoured. Culverts would be pulled.
Roads put into storage remain on the Forest Transportation System.

Appendix C

Public Involvement and Issues Eliminated from Detailed Analysis.

Introduction

This appendix contains a list of the issues that were considered by the IDT but were eliminated from detailed analysis. For each issue, a discussion is provided describing the issue and the reasons for eliminating it. In addition, this appendix contains a table that displays all of the public comments that were received during the scoping efforts and a description of how the comments were used is the project. The comment letters that we received are located in the project file.

Issues Eliminated From Detailed Analysis

1. Issue: Effects of project activities on old growth stands

One group that commented on the scoping notice requested that potential effects to old growth stands be considered. Potential effects were considered (see below) but a detailed analysis was not conducted because: (1) The proposed action (and no-action) would not decrease the amount of acres that currently meet old growth criteria; (2) Only a very small percentage of the old growth within the old growth management unit would have a vegetative treatment applied to it, and; (3) All of the Forest Plan standards regarding old growth management would be met and exceeded.

IPNF Forest Plan Old Growth Standard 10a states: “A definition for old growth is being developed by a Regional Task Force and will be used by the Forest when completed.” 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 4/92 by the Northern Region, Forest Service, USDA. The IPNF used the definitions in this report in allocating its Old Growth.

IPNF Forest Plan Old Growth Standard 10b states: “Maintain at least 10% of the forested portion of the IPNF as old growth.” The 1987 Forest Plan identified 2,310,000 acres as forested, which means a requirement to maintain 231,000 acres of Old Growth. The year 2001 IPNF Forest Plan Monitoring report documents that the Forest has 267,840 acres of allocated Old Growth (11.6% of the forested portion of the IPNF), and an additional 8,269 acres of additional unallocated field verified Old Growth, for a grand total of 276,109 acres of Old Growth (12% of the forested portion of the IPNF). This fully complies with and exceeds the Forest Plan Old Growth acreage standard by over 45,000 acres.

There is no Forest Plan Standard requiring additional replacement Old Growth, above the 10% requirement. The 45,000 acres of Old Growth in excess to the 10% required in the Forest Plan Standard provides a very substantial buffer. Besides this Old Growth, there are more than 500,000 additional acres of Mature Sawtimber Forest on the IPNF. Mature Forest is generally within a few decades of being old enough to meet Old Growth age thresholds. Together, Old Growth and other Mature Sawtimber Forest make up approximately 30% of the IPNF. Additionally, there are more than 800,000 acres of Immature Sawtimber (most of which will grow into Mature in less than 50 years).

The IPNF was divided up into old growth management units. The IPNF Forest Plan Old Growth Standard 10c states: "Select and maintain at least five percent of the forested portion of those old-growth units that have five percent or more existing old growth".

The proposed Canyon Creek Research Project occurs within old growth management unit #14. Within this unit, there is a total of 5,981 acres that are forested and of these, 688 acres meet old growth criteria. This equates to 11.5%.

The proposed action (Alternative 2) would manipulate vegetation over approximately 24 acres that occur within timber stands that currently meet old growth criteria. This includes portions of proposed Units #11 and #13 (portions of stands 857-2-68, 71, 73 and 76). The free selection treatment (see Chapter 2 for a definition) would be applied to the old growth portion of these units. The slash would be jackpot burned and these areas would be logged using the skyline yarding system. One main reason for manipulating these stands is to conduct research into how the treatment would affect their old growth characteristics. The treatment within these areas would retain the larger, old growth trees while removing a portion of the younger trees (trees less than 120 years old). The canopy cover within these treatment areas would be retained at 60% or greater following the activities. Following the treatments, these areas would still meet the old growth criteria.

For the reasons stated above, the proposed treatments in the Canyon Creek Project would be consistent with the IPNF Forest Plan regarding the management of Old Growth. The project file contains a list of old growth stands and a map as well as other related documents.

2. Issue: Effects of project activities on neotropical birds

A group requested that an analysis be conducted to determine what the proposed project effects would be on neotropical migrant birds. In January 2001, President Clinton signed an executive order that outlines the responsibilities of federal agencies to protect migratory birds. This executive order mandated that

environmental analysis of federal actions evaluate the effects of actions on migratory birds.

Neotropical migrant birds represent a large group of species that have widely divergent habitat requirements. Because there are numerous migrant birds, it would be impossible to treat all of the individuals in this group separately.

Hejl (1994) acknowledges that while we do not know all of the specifics of bird-habitat relations, we do understand many principles that would help maintain a healthy forest for most bird species: encourage old-growth characteristics, leave snags and replacement trees, leave or plant the natural diversity of trees found in the area, burn and allow fires to happen in a manner similar to natural fire regimes, and mimic natural landscape patterns. While no single forest condition or structural type will benefit all species simultaneously, providing a mosaic of habitat conditions and age classes will capitalize on habitat values for forest birds.

Idaho has 243 species of birds that breed in the state (Idaho Partners in Flight 2000). A diversity of vegetation and topography results in a diversity of species. While all birds are important for their roles in the ecosystem, not all birds and habitats are equal when it comes to threats to their persistence. Idaho Partners in Flight (IPF) has identified and prioritized four habitats that represent species of moderately 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 occur in the Canyon Creek project area: riparian habitat and dry ponderosa pine/Douglas-fir/grand fir forests. Nevertheless, these priority habitats would not be adversely impacted by the proposed actions. Applying Best Management practices and the Inland Native Fish Strategy (INFS) would protect and maintain riparian habitat that occurs along Canyon Creek and its tributaries (see Design Criteria and Mitigation Section). Also, a purpose of this project is to promote the restoration of dry ponderosa pine/Douglas-fir forests. It would encourage the long-term stability of dry habitats by altering species composition, treating overcrowded conditions of shade tolerant trees, and include fire to mimic natural disturbances. Because this project would not adversely affect riparian habitat, and is designed to help restore the original distribution of dry ponderosa pine/Douglas-fir forests, no further discussion and analysis are necessary.

3. Issue: Effects of project activities on fragmentation and cooridors

In response to public scoping efforts, one group requested that an analysis be conducted to determine how the proposal might impact the area as far as serving as wildlife travel corridors or affecting wildlife species through fragmentation.

Connectivity, a term coined in 1984 by G. Merriam and reflecting thought of many earlier ecologists (Mann and Plummer 1995), refers both to the abundance and spatial patterning of habitat and to the ability of members of a population to move from patch to patch of similar habitat (With and Crist 1995). Moreover, as a concept, it relates more to habitat specialists with limited dispersal abilities with a lower threshold to fragmentation than highly vagile species that overtime have perceived the landscape across a greater range of fragmentation, both natural (Johannesen and Ims 1996) and induced (With and Crist 1995).

There are no known or identified wildlife movement corridors within the project area, although habitats within the project area are probably important for some species.
Applying Best Management practices and the Inland Native Fish Strategy (INFS) would protect and maintain riparian habitat and potential corridors that occurs along Canyon Creek and its tributaries (see Design Criteria and Mitigation Section).

4. Issue: Effects of project activities on social and economic factors

Two groups submitted comments regarding social and economic factors. These groups stated that the project would damage social and economic uses and values of the forest for the benefit of the timber industry and that non-timber values are more important to local communities and the regional economy than are timber values. Therefore, they requested that the Forest Service conduct an analysis to determine how the proposal would impact both market and non-market values. In response to this request, the Forest Service considered conducting an economic analysis and/or a financial analysis. However, as discussed below, it was determined that these analyses would not be relevant to the project and therefore, they would not help the decision makers.

Economic Analysis and Consideration of Non-Market Values: The Forest Service is not proposing this project in order to supply products to the timber industry or for the purpose of helping support the local or regional economy. The primary purpose of the project is to conduct a forestry research study and in order to accomplish the research objectives it is necessary to remove some of the trees from the proposed treatment area. A timber sale was selected as the means to accomplish this in order to be economically practical. See the section

titled, “Alternatives considered but eliminated from further study” within Chapter 2, for additional discussion on why a timber sale is being utilized to conduct the research project.

The question of whether or not the economic benefits of market values from the project outweigh potential negative impacts to non-market values is not relevant to this proposed project. If one or more of the purposes of proposing the project were to provide an economic benefit to the community and/or region, then the question of market versus non-market values would be more relevant. However, even if this were the case, Forest Service wide direction regarding the consideration of non-market financial effects is that this type of analysis is more appropriate at a larger scale (such as forest planning). For a site-specific project, the effects that the proposal would have on economic uses and values on a community or regional basis would normally be negligible. The Forest Service publication “Economic Analysis for Forest Plan Implementation” indicates this direction (USDA 1989).

Financial Analysis: Rather than an economic analysis, the more common analysis to perform for site-specific projects is a financial analysis that displays market costs and revenues for the proposed action and alternatives. Typically, the primary purpose of this analysis is to provide the decision maker with information so that he/she can determine how an individual project may affect the financial efficiency of a program (such as an individual timber sale affecting the sale program), or determine how two or more action alternatives compare with one another on financial efficiency (Forest Service Handbook 2409.18, Chapter 32). However, in the case of this project, there is only one action alternative so a financial analysis would not help in comparing action alternatives to one another. In addition, even if the proposed project were to cost more money than it generates (e.g., below cost timber sale), this factor would not influence the selection of the action alternative over the no-action. Therefore, because of the unique nature of the project and the limited scope of the analysis (i.e., a very specific research project with no other action alternatives), a financial analysis was not conducted.

5. Issue: Effects of project activities on species viability

Two environmental groups provided comments regarding species viability. One group stated that the Forest Service must thoroughly analyze lynx population viability in order to comply with the lynx conservation assessment and strategy. Another group stated that the proposed project would jeopardize the viability of species that occur in forest ecosystems and that the Forest Service did not have any information to determine if the proposal would affect the long term viability of the species.

The Lynx Conservation Strategy (LCS) (Ruediger et al. 2000) outlines conservation measures that are intended to conserve lynx. Management plans that incorporate these conservation measures are not generally expected to have adverse impact on lynx. Implementation of these measures across the range of lynx is expected to lead to the conservation of the species. Other species such as the grizzly bear, woodland caribou, bald eagle and Northern gray wolf have approved recovery plans, which when implemented are designed to maintain species viability. Other species listed by the regional forester as 'sensitive' have conservation strategies in place, which are designed to maintain specs viability, when implemented. For example, the harlequin duck, townsend's big-earred bat and common loon have existing conservation strategies in place. Other species such as the northern goshawk, flammulated owl, fisher, pileated woodpecker and American marten have management standards that are designed to improve and maintain species populations and viability.

6. Issue: Ability to control prescribe burns

One individual who owns land adjacent to the Priest River Experimental Forest commented that he was concerned about the likelihood that a prescribed burn might burn out of control. More specifically, the individual wanted to make sure the Forest Service could control the fire so it did not burn onto his property or other private property.

A Prescribed Fire Burn Plan must be prepared and approved prior to any prescribed fire ignition. Any fire use project will only be implemented with trained and qualified personnel. Among the required elements of a plan are: description of area, goals and objectives of project, complexity and risk assessments, test fire provisions, prescription with weather and fuel parameters, ignition, holding, mop up, and contingency plans, and public and personnel safety considerations. Detailed weather forecasts are required prior to the final go/no-go decision. While escaped prescribed fires receive significant publicity, they account for a very small percentage of all prescribed fires. The last prescribed fire that that was ignited by the Forest Service in the Priest Lake area that escaped control was in 1991. A storm front that was not forecast passed over the burn, and high winds caused the burn to escape.

7. Issue: Purpose and need for project

In response to the scoping notice that was sent out to the public, letters were received from three organizations that contained questions or comments involving the purpose and need for the project. Some comments expressed disagreement over the need to do this research, and other comments questioned how it would be conducted. In response, a more comprehensive discussion of the purpose and need for this research project was included in chapter 1. In

addition, the description of the proposed action was expanded in both Chapter 2 and in Appendix A.

8. Issue: Effects of project on heritage resources

In response to scoping efforts for this project, the Idaho State Historic Preservation Office questioned whether or not an inventory had taken place for potential heritage resources in the project area.

An appropriate cultural resource inventory of the project area was conducted in accordance with Forest Plan direction - Section II (B)(1)(d) and Section II (E); and the Forest Site Inventory Strategy, 2001. No cultural property(s) were found within the project's area of potential effect. In 1994, forty-three heritage features, structures, or sites within the Priest River Experimental Forest were placed on the National Register of Historic Places. However, none of these sites are located within the project's area of potential effect.

Per the *Programmatic Agreement regarding Cultural Resource Management on Region 1 National Forests in the State of Idaho*, a report documenting the results of the inventory efforts as "No Historic Properties Affected" was completed. A recommendation to proceed with the project was included in this report. A summary of the inventory and subsequent report will be provided to the State Historic Preservation Office in an annual report. Any cultural resource sites discovered during project activities would be inventoried and protected if found to be of cultural significance. Decisions to avoid, protect, or mitigate impacts to these sites is in accordance with the National Historic Preservation Act of 1966. This issue has been eliminated from further analysis.

9. Issue: Effects of project on roadless areas

One comment was received from an environmental group requesting that the Forest Service discuss the presence of any roadless areas that might occur within or in the vicinity of the project area. There are no roadless areas within the vicinity of this project area. The Experimental Forest, as well as the nearby private and state lands, is roaded. Therefore, this issue was not considered in detail.

10. Issue: Effects of project on road access

The Idaho Department of Fish and Game responded to the scoping notice and recommended that the Forest Service maintain or reduce existing levels of motorized access. They suggested that road closure opportunities be considered.

As discussed in more detail in Appendix B, the IDT conducted the "Roads Analysis Process" (RAP) for this project. All of the roads within the project area

were reviewed according to the RAP process. As a result of this analysis, the Forest Service has determined which roads should be improved, which roads are currently in an acceptable condition, and which roads should be decommissioned. Appendix B and the description of Alternative 2 provide more information on what changes are being proposed. In summary, the proposed action would not change the amount of existing open road in the analysis area. The total road miles would be reduced by decommissioning 2.5 miles of road and putting 2.0 miles into storage. However, these roads are currently brushed closed so putting them into storage or decommissioning them would not decrease the existing open road density.

11. Issue: Effects to low Income or minority populations

In 1994, President Clinton signed an Executive Order on Environmental Justice requiring federal agencies to consider the effects of conducting activities related to human health and the environment in a manner that does not discriminate or have an effect of discriminating against low income and minority populations.

Within Bonner County, there are populations of minority groups. At the time the IPNF Forest Plan was developed, there was a two percent minority population. Also within the county, a substantial proportion of the population falls below the poverty line. Although minority and low income populations do live in the vicinity of the project area, the proposal would not discriminate against these groups. All contracts offered by the Forest Service contain Equal Employment Opportunity requirements.

12. Issue: Effects to Threatened or Endangered plant species

No Endangered plant species are suspected to occur in the IPNF. It was determined that no suitable habitat for the Threatened species water howellia (*Howellia aquatilis*), Ute ladies'-tresses (*Spiranthes diluvialis*) or Spalding's catchfly (*Silene spaldingii*) occurs in the project area. Full disclosure of this determination is included in the TES plants report in the project file.

13. Issue: Effects on Visual Quality

The IPNF Forest Plan (page III-62) indicates that the PREF should be managed for the adopted visual quality objective (VQO), subject to research needs. The VQO assigned to the area that the project is proposed in is "modification". Modification means: human activity may dominate the landscape but that the area should appear as a natural occurrence when viewed in the background. Alternative 2 (the proposed action) should meet this visual quality objective. The proposed treatments (both the vegetation and road treatments) will not create any large openings in the timber stands. The small openings that are created through the vegetation treatments and associated logging will not be very evident

as seen in the background. The skyline yarding in some of the units may produce areas that appear as stripes in the timber in the event that the area is viewed in the foreground. However, as seen from a farther distance away, the areas should not be readily apparent.

14. Issue: Effects of Livestock Grazing

There are no grazing allotments on the PREF. Grazing does occur on a small amount of private land within some of the cumulative effects analysis areas for different resources. If the effects of this activity are relevant to individual resources, the effects are discussed in Chapter 3.

15. Issue: Effects of project on Forest Vegetation

In several places in the EA, a general description is provided on how the proposed action would affect the forest vegetation within the proposed treatment areas (e.g., Appendix A and the description of the proposed action). However, a detailed analysis was not conducted on how the proposal would influence such things as species composition, structure and the vegetation patterns across the project area and/or the entire PREF. Because of the unique management objectives for the experimental forest as well as the narrow purpose and need for this particular project, a thorough analysis of these effects would not have been relevant to the decision. However, the project file does contain maps and figures documenting the existing composition, structure and vegetation patterns in the PREF and project file. In addition, the project file contains a list of past timber management activities in the area and related documents.

Public Scoping Comments and Disposition Table

The following table lists the substantial comments that were received as a result of the scoping efforts that were undertaken for this analysis. These comments are listed in the left column of the table. The middle column lists an abbreviation of the group or individual who submitted the comments and the column on the right indicates how the IDT used the comment in the development of the EA.

COMMENTS	NAME	RESOLUTION STRATEGY
We request that a no-harvest, restoration only alternative, emphasizing natural disturbance processes, be developed and given fair and adequate consideration. It is the duty of the Forest Service to develop a reasonable alternative that would exclude the harmful effects of commercial logging while encouraging natural recovery. Such a no-harvest, restoration alternative is not analogous to the no-action alternative	FCC	Consider a no-harvest, restoration **alternative**.
It is essential that the analysis include an in depth treatment cumulative effects especially in regards to soils, water quality, fragmentation, old growth, TES, MIS, and neotopical migrant birds	FCC	**Analyze** the cumulative effects that the alternatives would have upon these resources or indicate why analysis was not conducted. Consider an **alternative** that would not treat any stands that meet old growth criteria.
The cumulative effects analysis should address the condition of the streams in relation to all past management activities as well as considering the present proposal	EC	**Analyze** the cumulative effects that the alternatives would have upon these resources or indicate why analysis was not conducted.
All activities including past, present, and reasonably foreseeable future activities on each and every land ownership must be incorporated	FCC	**Analyze** the cumulative effects that the alternatives would have upon these resources or indicate why analysis was not conducted.
The cumulative impacts to the Priest River Experimental Forest must be thoroughly disclosed	EC	**Analyze** the cumulative effects that the alternatives would have upon these resources or indicate why analysis was not conducted.
The purpose and need of the project can be met more efficiently through means other than commercial timber harvest and those means must be given unbiased attention	FCC	Consider a no-harvest, restoration **alternative.**
It is admirable that the intention of this project is long term monitoring. In order to insure this long term monitoring effort, funds should be set aside in a separate account specifically for that purpose. If there is no guaranteed funds there will be no guaranteed monitoring	LC	Discuss in **monitoring section**.
The purpose and need emphasizes "structure and composition" rather than processes. Additionally,	EC	Include an **issue** in EA on the purpose and need for the project and address.

the purpose and need fails to recognize the essential role that insect and disease perform in nutrient cycling and forest regeneration		
We are concerned that the purpose and need of the proposed research is fundamentally, scientifically flawed and request scientific substantiation of the purpose and need	FCC	Include an **issue** in EA on the purpose and need for the project and address.
The project will damage social and economic uses and values associated with natural forests (including forest that are affected by beneficial natural disturbance) for the benefit of the timber industry, even through non-timber uses and values are far more important to local communities and the regional economy	FCC	Include an **issue** in EA on economic/social considerations and address.
We are concerned with the adverse economic effects of commercial logging on public lands and the damage and loss of ecosystem service values associated with standing or otherwise intact forest ecosystems	FCC	Include an **issue** in EA on economic/social considerations and address.
We request an impartial analysis of all values, both market and non-market associated with each alternative including the no-action and no commercial harvest alternatives. This include employment and income (including multipliers) associated with non-timber use	FCC	Include an **issue** in EA on economic/social considerations and address.
Losses of ecological integrity should be considered in the economic analysis in terms of loss of habitat and ability of the forests to provide ecosystem services	EC	Include an **issue** in EA on economic/social considerations and address.
The opportunity costs of the logging program, which include the value of uses forgone on areas logged plus the benefits associated with alternative uses of timber sale funds should be evaluated on a project basis	FCC	Include an **issue** in EA on economic/social considerations and address.
Our concerns include the economic efficiency of the timber sale, whether or not the costs and benefits, beyond those to the federal government,	FCC	Include an **issue** in EA on economic/social considerations and address.

meet the government mandate of net public benefits. In other words, are the greater values of standing forest ecosystems disregarded for the short-term financial benefit of the sale of trees to the timber industry?		
We are concerned with the financial efficiency of the Canyon Creek Research Timber Sale, the so-called "below cost" or "deficit sale" issue.	FCC	Include an **issue** in EA on economic/social considerations and address.
No problem - go for it	ROSINSKI	No resolution needed.
A NEPA document should thoroughly analyze impact to Candidate, Sensitive, Threatened, Endangered and Management Indicator Species	EC	**Analyze** the effects that the alternatives would have upon these species or indicate why analysis was not conducted.
Areas that contain goshawk nests should be given the maximum unlogged buffer area that would insure complete lack of disturbance. The EA needs to disclose the size and effectiveness of the buffer used and disclose scientific literature that supports the effectiveness of the proposed logging around goshawk nests and also present literature that recommends more stringent proposals. The EA should disclose in detail whether and how the goshawk surveys will be conducted.	LC	**Analyze** the effects that the alternatives would have upon goshawk or indicate why analysis was not conducted.
The IPNF must thoroughly analyze lynx population viability and map habitat connectivity and core areas in order to comply with the lynx conservation assessment and strategy	EC	Include an **issue** in EA on species viability and address.
The project will jeopardize the viability of species that thrive in forest ecosystems through activities associated with timber harvest and road building, intervene in natural disturbance process that are vital to ecosystem sustainability, and degrade water quality and watershed condition.	FCC	Include an **issue** in EA on species viability and address.
The Forest Service has no up-to-date population data describing population numbers, locations, and trends, nor monitoring data on which the agency can rely to determine that the actions proposed in the context of the Canyon Creek Research Timber	FCC	Include an **issue** in EA on species viability and address.

Sale will maintain numbers and distribution of these species sufficient for insuring long term viability		
We specifically request that the analysis address the related issues of population viability and distribution throughout its geographic range in regards to all species of concern, in order to comply with USDA Regulation 9500-4 and 36 CFR EC.19. To adequately analyze population viability, population dynamics must be explicitly considered. Population dynamics refers to persistence of a population over time which is key to making predictions about population viability	EC	Include an **issue** in EA on species viability and address.
The planned activities are likely to jeopardize the viability of species that find optimal habitat in interior forests, forests with well-developed structures, and forests naturally disturbed by physical and biological processes	FCC	Include an **issue** in EA on species viability and address.
Prescribed fire would stimulate sprouting and germination of valuable forage vegetation for deer, elk, and moose	IDF&G	No resolution needed.
Our only concern is making sure the controlled burn stays controlled	GRIFFIN	Include an **issue** in EA on prescribed fires.
We request a careful analysis of the impacts to fisheries and water quality, including considerations of sedimentation, increases in peak flow, channel stability, risk of rain-on-snow events, and increases in stream water temperature	EC	Include an **issue** in EA on water quality and fish habitat.
The East River watershed, Middle Fork, North Fork and 2 mile mainstem currently a 303(d) listed watershed. The DEQ draft subbasin assessment (December 2000) recommends delisting of the Middle Fork and North Fork. The main stem (lower 2 miles) is however being differed until a more thorough fish population survey can be conducted in 2001. If the main stem were to be judged as Not Full Support of cold water biota and salmonid spawning beneficial uses, then the entire East	EC	Include an **issue** in EA on water quality and fish habitat.

River watershed will again become 303(d) listed, and will require a legally mandated TMDL		
As many projects intend to decommission roads rather than obliterating, the potential continuation of water quality degradation associated with decommissioning should be researched.	EC	As indicated in the scoping notice sent out to the public, one part of the original research plans was to conduct research into how road obliteration would affect water quality. However, since the scoping notice was mailed, researchers have decided to conduct that part of the study within the Deception Creek Experimental Forest rather than the Priest River Exp. Forest. Deception Creek provides better areas for this research as there are higher road densities in that area that offer more closure opportunities. A study of this sort at Deception Creek could be replicated easier and therefore, results would be more defensible.
An interim policy for the East River watershed, including tributaries such as Canyon Creek, would be a "no net sediment load increase". This needs to be considered in the planning of this project.	DEQ	**Design project** to comply and conduct **analysis** to determine impacts.
We would like to see a thorough discussion of the BMPs and mitigation measures that the IPNF would propose to ameliorate project impacts.	EC	Include BMP's and mitigation measures in EA.
I am interested in the health and maintenance of the forest	MARTIN	No resolution needed.
While research that enhances scientific understanding is essential, it is likewise critical that scientific analysis explicitly disclose the degree of uncertainty inherent in natural ecosystems	EC	Include an **issue** in EA on the purpose and need for the project and address.
When logging projects are proposed, forest service researchers should suggest that, within ecological bounds, cutting units are distributed in a manner that lends the most to scientific understanding	EC	Include an **issue** in EA on the purpose and need for the project and address.
While it is essential to conduct what logging does occur on national forests in the most ecologically sensitive manner possible (as informed by science), forest service researchers must shift research towards understanding means of restoring forests from past impacts. We do not believe that the project considering the impacts of intensive cutting methods (e.g. free selection group selection, and strip shelterwood regeneration) is	EC	Include an **issue** in EA on the purpose and need for the project and address.

the most productive use of scientific resources		
We request explanation of how researchers intend to mimic natural disturbances including stand replacing fire and ice and windstorms. Comparisons to the impacts of the natural processes themselves should be conducted as checks of the effectiveness of the process emulation. We suggest that paired site approaches to understanding the impacts of natural disturbance may be more informative than conducting studies using likely unproven methods to mimic natural disturbance	EC	Include an **issue** in EA on the purpose and need for the project and address.
Stream monitoring should take place in the affected 1st or 2nd order streams because, as the FS acknowledges, it usually cannot detect the effect of only one project on higher order streams. The EA should thoroughly disclose the methodology that will be used to monitor and evaluate the process	LC	As indicated in the scoping notice sent out to the public, one part of the original resea plans was to conduct research into how road obliteration would affect water quality. However, since the scoping notice was mailed, researchers have decided to conduct part of the study within the Deception Creek Experimental Forest rather than the Prie River Exp. Forest. Deception Creek provides better areas for this research as there a higher road densities in that area that offer more closure opportunities. A study of thi at Deception Creek could be replicated easier and therefore, results would be more defensible.
The map provided shows that the road obliteration ends before the stream crossing. The obliteration, and monitoring thereof, should include pulling culverts at stream crossings	LC	We believe that this was a mapping error. The roads that will be obliterated will have all of the culverts removed (among other activities- see the design criteria). For roads were only a portion of the road is proposed for obliteration, all of the culverts past the closure point will be removed.
We feel that a study that examines the impacts of various thinning treatments and prescribed burning may produce scientifically interesting and applicable results. It is essential that one of the treatments consists singly of prescribed burning	EC	Include an **issue** in EA on the purpose and need for the project and address.
The proposed research should be designed in a manner that emphasizes ecosystem process rather than static conditions. For this reason, considering landscape scale pattern and conducting the project over a long time period is essential	EC	Include an **issue** in EA on the purpose and need for the project and address.
It is essential that large tracts of undisturbed forests remain in the experimental forests in order to provide controls for the uncontrolled experiments	EC	Include an **issue** in EA on the purpose and need for the project and address.

elsewhere on national forests and to allow for future landscape scale studies		
I understand the importance of conducting controlled experiments with randomized treatments and replication, I feet that it is unfortunate that experiments will fragment the experimental forests when uncontrolled logging experiments are being conducted throughout our national forests.	EC	No resolution needed for most of comment. Fragmentation included as **issue** and discussed.
The NEPA document should substantiate the high levels of mistletoe and blister rust infection in the project area. The current stand conditions should be thoroughly detailed. If the analysis intends to invoke concepts such as historic range of variability or historic conditions, the methodologies used to estimate these concepts must be thoroughly explained	EC	Include an **issue** in EA on the purpose and need for the project and address.
No forest will ever be resilient to insects and disease, nor is complete resilience a desirable objective. Further, little or no research has suggested that current levels of insect infestation or disease are outside of historical ranges	EC	Include an **issue** in EA on the purpose and need for the project and address.
I am mainly concerned with the disease with the timber in your area that you will be working at	PLECAS	No resolution needed.
I disagree with the Project objective stated on page 2 of the scoping notice, "...to ultimately create forests structures and compositions that are resilient to endemic diseases such as root and stem diseases, mistletoe, and white pine blister rust." The Forest Service takes the view that forest diseases are bad and need to be managed in an attempt to limit their existence. As I understand it, pests and diseases are a natural part o the forest ecosystem and drive forest succession. The Environmental Assessment (EA) should present a complete discussion of the importance of these natural processes, and scientifically credible data	LC	Include an **issue** in EA on the purpose and need for the project and address.

should be presented in the EA that show the level of insect and disease activity, by year, since such records have been kept.		
The EA should contain a complete discussion of the importance of diseases and the role it plays in the forest ecosystem. Divergent opinions than those expressed in the EA should also be presented. I would suggest, at a minimum, scientific research dealing with these matters by Torgensen, E. Bull and C. Parks from the LaGrande Research Station	LC	Include an **issue** in EA on the purpose and need for the project and address.
Opinions on the subject [importance of disease] by non-federal scientists who are at odds with the premise underlying the premise of the proposed project be discussed in the body of the EA.	LC	Include an **issue** in EA on the purpose and need for the project and address.
The current premise regarding the need to manage the public's forest so it is more resilient to endemic diseases should be viewed in the light of these previous failures	LC	Include an **issue** in EA on the purpose and need for the project and address.
I am interested in your noxious weed management especially	MARTIN	Include an **issue** in EA on noxious weeds
Snags - Consider exceeding IPNF guidelines, latest research indicates current standards insufficient. Also, consider snag species and decay class in formulating guidelines	SCA	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.
The EA should disclose the ability of the FS to maintain an adequate number of snags given the need to conform to the OSHA regulations	LC	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.
A pre and post project snag survey should be part of the monitoring process. A complete discussion of the effectiveness IPNF snag guidelines in relation to the use of snags in regeneration openings, its effect on populations of snag dependent species should be presented in the EA.	LC	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.
We suggest that large relic larch be retained (perhaps by girdling) even if trees display mistletoe infection	IDF&G	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.

Adequate numbers of large trees and snags should be retained within harvest units to ensure long-term snag recruitment and maintenance in the area.	IDF&G	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.
Trees and snags retained for wildlife should be located in sites where they are unlikely to be lost through firewood cutting or wind-throw	IDF&G	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.
For long-term maintenance of large trees, snags, and logs across the forest landscape, we suggest that selected large (>15" dbh with some >20" dbh) individual trees and groups of trees be left unharvested indefinitely within each timber sale unit.	IDF&G	Include snag discussions/effects in the TES/MIS wildlife analysis and include design criteria/mitigation measures.
We support the objective of maintaining and restoring old growth forest structures within the western red cedar and western hemlock types	IDF&G	No resolution needed.
I do not see a need to try to accelerate the process by which an area develops old growth characteristics. Forests thin themselves over time by the very same processes this project attempts to restrict.	LC	Include an **issue** in EA on the purpose and need for the project and address.
The analysis should detail the extent of old growth stands and stands with old growth attributes proposed for treatment	EC	Include an **issue** in EA on old growth and discuss. Consider an alternative would not propose manipulating the vegetation within any stands that meet OG criteria.
Reseeding - consider native seed	SCA	Include discussion in noxious weed issue and consider design feature.
The quantitative and qualitative monitoring results as to the effectiveness of the Priest Lake Noxious Weed Control Project should be disclosed. The effectiveness of noxious weed control in the implementation of this project should also be closely monitored. The monitoring should include a complete qualitative and quantitative survey of noxious weed infestations in the affected areas both before and after the project.	LC	Include an **issue** in EA on noxious weeds and discuss.
We encourage you to implement thinning from below, free selection, and prescribed fire to maintain and facilitate natural regeneration within	IDF&G	No resolution needed.

40 acres of ponderosa pine		
Any proposed mechanical treatments must be thoroughly described. The species, size, and distribution of any trees proposed for cutting must be disclosed	EC	Discuss in description of proposed action.
Retention of large old ponderosa pine trees, snags, and logs would be valuable measures within Unit 2.	IDF&G	Discuss in description of proposed action.
I would support the use of utilizing small, existing canopy openings as opposed to created openings. There is plenty of opportunity to monitor the numerous "created" opening where white pine has been planted	LC	Include an **issue** in EA on the purpose and need for the project and address.
I disagree with the presumption that the Forest Service (FS) can successfully speed up the process of succession through logging. How does the FS know that, "...these areas are not sustainable and will not develop into large, old forest compositions and structures" if left alone? Also, what qualities will be lost overtime by logging these areas? And what unintended consequences will result by manipulating these areas, such as, but not limited to, the acceleration of some root diseases as a result of logging	LC	Include an **issue** in EA on the purpose and need for the project and address.
A NEPA document should include a thorough analysis of the impacts of the proposed project to the functionality of the area as a wildlife corridor. The landscape pattern of fragmentation should be considered (i.e. the network of core areas and corridors).	EC	Include an **issue** in EA on fragmentation and corridors and discuss.
Has this proposed undertaking been inventoried for Heritage Resources?	SHPO	Include and **issue** in EA on heritage resources and discuss.
Consider - determining any nutrient limitations existing on activity sites.	SCA	Include an **issue** in EA on soil productivity and discuss.
A NEPA document should disclose the cumulative detriment soil impacts in the project area as well as the anticipated impacts due to the project.	EC	Include an **issue** in EA on soil productivity and discuss.

Opportunities for road closures should be considered	IDF&G	Include an **issue** in EA on access and discuss.
We support the research designed to address the ecological impacts of road reconstruction and obliteration. The study should consider methods of road obliteration ranging from short berms blocking entry to complete road contouring	EC	As indicated in the scoping notice sent out to the public, one part of the original research plans was to conduct research into how road obliteration would affect water quality. However, since the scoping notice was mailed, researchers have decided to conduct that part of the study within the Deception Creek Experimental Forest rather than the Priest River Exp. Forest. Deception Creek provides better areas for this research as there are higher road densities in that area thatoffer more closure opportunities. A study of this sort at Deception Creek could be replicated easier and therefore, results would be more defensible.
We support proposed increase in culvert size to reduce risk of stream damage at selected locations	IDF&G	No resolution needed.
I support the monitoring the effects of the road obliteration on the affected streams. I would hope that this monitoring would be conducted in a scientifically credible manner so as to produce reliable empirical measurements.	LC	As indicated in the scoping notice sent out to the public, one part of the original research plans was to conduct research into how road obliteration would affect water quality. However, since the scoping notice was mailed, researchers have decided to conduct that part of the study within the Deception Creek Experimental Forest rather than the Priest River Exp. Forest. Deception Creek provides better areas for this research as there are higher road densities in that area thatoffer more closure opportunities. A study of this sort at Deception Creek could be replicated easier and therefore, results would be more defensible.
The presence of any roadless areas within or in the vicinity of the analysis area should be disclosed	EC	Include an **issue** in EA on roadless and discuss.
We recommend that proposed management activities maintain or reduce existing levels of motorized access	IDF&G	Include an **issue** in EA on access and discuss.

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Name/Organization	Mail Id #
DEQ – Department Environmental Quality	3425
ROSINSKI, STEVE	6237
MARTIN, JEAN	6238
SHPO –State Historic Preservation Office	5401
SCA – Selkirk Conservation Alliance	3636
PLECAS, FRITZ	6240
IDF&G – Idaho Fish and Game	391
FCC – Forest Conservation Council	6080
EC – Ecology Center	219
GRIFFIN, GERALD	6241
LC – Lands Council	1577

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Appendix E

Canyon Creek Research Project Interdisciplinary Team

Name	Title	Area of Expertise	Qualifications	Office
Russell Graham	Research Silviculturist and Director's Rep. for PREF	Forest Research- Soils, Silviculture	Ph.D. Forestry. USDA FS, 32 years.	USFS, Rocky Mtn Research Station at the Forest Science Laboratory, Moscow, ID.
Dr. Theresa B. Jain	Research Forester	Principal Investigator on the Research Project	Ph.D. Forestry, USDA FS, 20 years.	USFS, Rocky Mtn Research Station at the Forest Science Laboratory, Moscow, ID.
Jill Cobb	Hydrologist	Water Resources Soils	B.A. Geography & Ecosystems Analysis, M.S. Watershed Mgmt., USDA FS 17 years	USFS, IPNF , Priest Lake Ranger District
David Cobb	IDT Leader	NEPA	B.S. Forest Management, M.S. Forest Management; USDA FS, 11 years	USFS, IPNF,Priest Lake Ranger District
Matt Davis	Fish Biologist	Fisheries	M.S. Fisheries Resources, B.A. Wildlife Biology, USDA FS 6 years.	USFS, IPNF, Priest Lake Ranger District
Anna E. Hammet	Botanist	TES and Rare Plants Noxious Weeds	B.A. Biology (Botany); USDA FS, 24 years	USFS, IPNF, Sandpoint Ranger District
Dan Jackson	Engineer	Transportation Planning and Engineering	North Idaho College and University of Idaho, Civil Engineering, USDA FS, 27 years.	USFS, IPNF, Priest Lake Ranger District
Tim Layser	Wildlife Biologist	TES and Other Wildlife	B.S. Wildlife Biology, M.S. Environmental Science-Nat Res Mgmt; USDA FS, 23 years	USFS, IPNF, Priest Lake Ranger District

Support Team Members – The following individuals provided technical or other support to the analysis

Name	Title	Area of Support	Office
Teresa Asleson	Forestry Technician	Heritage Resources Inventory	USFS, IPNF, Priest Lake
Bob Denner	Forester	Superintendent of PREF	USFS, RMRS, PREF Headquarters, Priest River, ID.
Dan Frigard	Forest Technician	Logging Feasibility, Sale Prep.	USFS, IPNF,Coeur d' Alene Ranger Station
John Lhotka	Forester	Forest Research	Rocky Mtn Research Station at the Forest Science Laboratory, Moscow, ID.

Name	Title	Area of Support	Office
Camilla Cary	Writer-Editor	Public Involvement Content Analysis Document Editor EIS	USFS, IPNF, Priest Lake Ranger District
Brett Lyndaker	Biological Technician	TES and MIS wildlife Analysis	Sandpoint Ranger District
Deb Scribner	Database Coordinator	GIS Mapping	Sandpoint Ranger District
Gary Weber	Assistant Fuel Management Officer	Fire/fuels	Priest Lake Ranger District

Appendix F

List of EA Recipients

The following agencies, organizations and individuals were mailed a copy of this EA in paper or compact disc format.

Organization	Last Name	First Name
	Gollberg	Greg
Spokesman Review (North Idaho Office)		
The Lands Council	Attemann	Rein
	Rosenberg	Barry
The Ecology Center	Buckley	Lauren
	Rosinski	Steve
	Martin	Jean
Idaho Fish and Game	Tourtlotte	Greg
	Plecas	Fritz
Chemical Landscape Mgmt	Kluttz	David
Idaho State Historical Preservation Office	Davis	Mary Anne
	Griffin	Gerald
Forest Conservation Council	Bird	Bryan
Idaho Dept. of Environmental Quality	Rothrock	Glen
Selkirk Conservation Alliance	Sprengel	Mark
Coeur D' Alene Tribe	Finan	Charles
Kalispel Tribal Office	Nenema	Glen
Kootenai Tribe of Idaho	Soults	Scott

Appendix G

Site Specific Best Management Practices

Introduction

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

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

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

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

Regulations pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code. The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also covered.

The objective of this appendix is to provide conservation practices for use on National Forest Lands to minimize the effects of management activities on soil and water resources. The conservation practices were compiled from Forest Service manuals, handbooks, contract and permit provisions, to directly or indirectly improve water quality, reduce losses in soil productivity and erosion, and abate or mitigate management effects, while meeting other resource goals and objectives. They are of three basic forms: administrative, preventive and corrective. These practices are neither detailed prescriptions nor solutions for specific problems. They are purposely broad. These practices are action initiating process mechanisms, which call for the development of requirements and considerations to be addressed prior to and during the formulation of alternatives for land management actions. They serve as checkpoints, which are considered in formulating a plan, a program and/or a project.

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

1. The physical, meteorological and hydrologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, soil type, vegetative cover, etc.).

2. The type of activity imposed on a given environment (recreation, mineral exploration, timber management, etc.) and its extent and magnitude.

3. The method of application and the duration of the activity (grazing system used, types of silvicultural practice used, constant vs. seasonal use, recurrent application or onetime application, etc.).

4. The season of the year that the activity occurs or is applied.

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

BMP Implementation Process

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

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

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

FORMAT OF THE BMPS

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

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

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

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

and/or experience). The expected effectiveness of the SWCP is rated either High, Moderate or Low.

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

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

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

Or

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

Or

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

Low: Effectiveness unknown or unverified, and there is little to no documentation

Or

Applied logic is uncertain in this case, or the practice is estimated to be less than 75% effective.

Or

This practice is speculative and needs both effectiveness and validation monitoring.

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

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

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

ITEMS COMMON TO ALL SOIL AND WATER CONSERVATION PRACTICES

Responsibility For Implementation: The District Ranger (through the Presale Forester) is responsible for insuring the factors identified in the following SWCP's are incorporated into: Timber Sale Contracts through the inclusion of proper B and/or C provisions; or Public Works Contracts through the inclusion of specific contract clauses.

The Contracting Officer, through his/her official representative (Sale Administrator and/or Engineering Representatives for timber sale contracts; and Contracting Officers Representative for public works contracts) is responsible for insuring that the provisions are properly administered on the ground.

Monitoring: Implementation and effectiveness of water quality mitigation measures are also monitored annually. This includes routine monitoring by timber sale administrators, road construction inspectors, and resource specialists which is documented in diaries and project files. Basically, water quality monitoring is a review of BMP implementation and a *visual evaluation* BMP effectiveness. Any necessary corrective action is taken immediately. Such action may include modification of the BMP, modification of the project, termination of the project, or modification of the state water quality standards.

Abbreviations

TSC = Timber Sale Contract
TSA = Timber Sale Administrator Representative
PWC = Public Works Contract
SCA = Stream Channel Alteration Act
BMP = Best Management Practices
SPS = Special Project Specifications
CFR = Code of Federal Regulations
SAM = Sale Area Map
COR = Contracting Officer
IFPA = Idaho Forest Practices Act
SWCP= Soil and Water Conservation Practices
SMZ = Streamside Management Zone
EPA = Environmental Protection Zone

KEY SOIL AND WATER CONSERVATION PRACTICES

Class * Soil and Water Conservation Practice (FSH 2509.22)

11 WATERSHED MANAGEMENT

W 11.07 Oil and Hazardous Substance Spill Contingency Planning
W 11.09 Management by Closure to Use
W 11.11 Petroleum Storage & Delivery Facilities & Mgt

13 VEGETATION MANIPULATION

G 13.02 Slope Limitations for Tractor Operation
G 13.03 Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
E 13.04 Revegetation of Surface Disturbed Areas
E 13.05 Soil Protection During and After Slash Windrowing
E 13.06 Soil Moisture Limitations for Tractor Operation

14 TIMBER

A 14.02 Timber Harvest Unit Design
A 14.03 Use of Sale Area Maps for Designating Soil and Water Protection Needs
A 14.04 Limiting the Operating Period of Timber Sale Activities
E 14.05 Protection of Unstable Areas
A 14.06 Riparian Area Designation
G 14.07 Determining Tractor Loggable Ground
E 14.08 Tractor Skidding Design
E 14.09 Suspended Log Yarding in Timber Harvesting
A 14.10 Log Landing Location and Design
E 14.11 Log Landing Erosion Prevention and Control
E 14.12 Erosion Prevention and Control Measures During Timber Sale Operations
E 14.13 Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities
E 14.14 Revegetation of Areas Disturbed by Harvest Activities
E 14.15 Erosion Control on Skid Trails
E 14.16 Meadow Protection During Timber Harvesting
S 14.17 Streamcourse Protection (Implementation and Enforcement
E 14.18 Erosion Control Structure Maintenance
A 14.19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
E 14.20 Slash Treatment in Sensitive Areas
A 14.22 Modification of the Timber Sale Contract

15 ROADS AND TRAILS

A 15.02 General Guidelines for Road Location/Design
E 15.03 Road and Trail Erosion Control Plan
E 15.04 Timing of Construction Activities
E 15.05 Slope Stabilization and Prevention of Mass Failures
E 15.06 Mitigation of Surface Erosion and Stabilization of Slopes
E 15.07 Control of Permanent Road Drainage
E 15.08 Pioneer Road Construction
E 15.09 Timely Erosion Control Measures on Incomplete Road and Streamcrossing

Projects
E 15.10 Control of Road Construction Excavation & Sidecast Material
S 15.11 Servicing and Refueling of Equipment
S 15.12 Control of Construction In Riparian Areas
S 15.13 Controlling In-Channel Excavation
S 15.14 Diversion of Flows Around construction Sites
S 15.15 Stream crossings on Temporary Roads
S 15.16 Bridge & Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
E. 15.17 Regulation of Borrow Pits, Gravel Sources, and Quarries
E 15.18 Disposal of Right-of-Way and Roadside Debris
S 15.19 Streambank Protection
E 15.21 Maintenance of Roads
E 15.22 Road Surface Treatment to Prevent Loss of Materials
E 15.23 Traffic Control During Wet Periods
G 15.24 Snow Removal Controls
E 15.25 Obliteration of Temporary Roads
E 15.27 Trail Maintenance and Rehabilitation

18 FUELS MANAGEMENT
E 18.02 Formulation of Fire Prescriptions
E 18.03 Protection of Soil and Water from Prescribed Burning Effects

* **CLASSES OF SWCP (BMP)**
A = Administrative G = Ground Disturbance Reduction
E = Erosion Reduction W = Water Quality Protection
S = Stream Channel Protection/Stream Sediment Reduction

BEST MANAGEMENT PRACTICES

PRACTICE 14.03 - Use of Sale Area Maps for Designating Soil and Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and special treatment areas, to insure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High

COMPLIANCE: No related FPA rule

IMPLEMENTATION: The following features will be designated on the SAM:

a. The stream courses (perennial, intermittent, and ephemeral) listed below will be designated as Stream Course Protection areas to be protected under the TSC. During layout of the units these areas will be excluded where possible. Where these areas cannot be easily excluded from the unit, these areas will be excluded by designating the timber as leave trees. INFS standards and protected stream courses will be applied to the following areas:

1. Canyon Creek - The entire mainstem length and its tributaries
2. East River - The entire mainstem length and its tributaries,
3. Middle Fork of the East River - The entire mainstem length and its tributaries,

b. Wetlands (meadows, lakes, potholes, etc.) to be protected per the timber sale contract clauses are those designated on the Fish and Wildlife Service 1:24000 scale wetland maps.

c. Ephemeral channels will be protected through unit layout, marking plans, and/or designation on sale area maps.

The Purchaser and the Sale Administrator prior to harvesting will review these features on the ground.

A Watershed Specialist (Forest or District) will work with the Presale Forester to insure that the above features have been designated on the Sale Area Map during contract development.

PRACTICE: 14.11 - Log Landing Erosion Prevention and Control
PRACTICE: 14.12 - Erosion Prevention and Control During Timber Sale Operations
PRACTICE: 14.15 - Erosion Control on Skid Trails.

OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following minimum criteria will be used in controlling erosion and restoring landings and skid trails so as to minimize erosion:

General:

1. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable outside of Riparian Habitat Conservation Areas.

2. Seeding will be done with a seed/fertilizer mix specified in the contract.

Landings:

1. Landings will not be located in ephemeral draws or swales that were created by or are prone to landslides.

2. During period of use, landing will be maintained in such a manner that debris and sediment are not delivered to any streams.

3. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed.

4. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.

Skid Trails:

1. Unit design and location will facilitate logging with a minimum amount of excavated skid trails. Where excavated trails are constructed they will be kept to a minimum and must be obliterated by the purchaser following completion of the logging activities. The obliteration will include restoring natural slope contours and placing slash and logs on top of the disturbed soil, and use of seeding (and/or mulching) where needed.

2. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.

1. Spacing of water bars on skid trails will be based on guides for controlling sediment from secondary logging roads (no date). If necessary, additional water bars will be prescribed by the sale administrator and/or watershed specialist.

2. All skid trail and landing locations will be approved by the Forest Service prior to harvesting and will be rehabilitated as necessary to assure that normal drainage patterns are maintained, and that exposed soil surfaces are seeded or covered with slash. This will minimize the potential for sediment production and delivery.

3. In units with ground skidding, only existing skid trails will be used or the units will be winter logged to prevent new soil compaction above existing levels.

4. Skid trail distance will average 100 feet or greater on ground skidded units, except where the trails converge to landings and as terrain dictates otherwise. This measure will help assure that no more than 15 percent of the activity area will be detrimentally disturbed per Region-1 soil standards.

5. Mechanical fellers will only be allowed off skidtrails if they travel on 18 inches of snow, frozen ground, or a slash mat (to avoid soil compaction levels that exceed Region 1 standards).

Corridors:

1. Corridors that have become entrenched below the litter layer into the top soil and could channel water will be water-barred, scarified and/or covered with debris.

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

OBJECTIVE: To assure the adequacy of required erosion control work on timber sales.

EFFECTIVENESS: High

COMPLIANCE: Not directly related FPA rule.

IMPLEMENTATION: The TSC requires that upon the Purchaser's written request and assurance that work has been completed the Forest Service shall perform an inspection. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. The Forest Service will not accept as complete, erosion control measures that fail to meet this criteria.

PRACTICE 15.07 - Control of Permanent Road Drainage

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA rules

IMPLEMENTATION: The following items will be included in the identified road contract specifications or drawings.

1. *For New Construction and Reconstruction* - The following criteria will be incorporated into the road design:

a. Any new temporary roads will be constructed as outsloped roads and will follow the natural terrain. Following use, the purchaser will obliterate these roads by restoring natural slope contours and placing slash and logs on top of the disturbed soil, and seed if needed. The purpose of this requirement is to minimize potential for increasing sediment production and delivery.

b. Road reconstruction will include increasing pipe sizes or changing design on some of the existing stream crossings to provide fish passage (if needed) and pass 100 year flood discharges and prevent diversion of streamflow by the road.

c. Unstable cut and fill slopes will be stabilized.

d. Additional relief culverts will be installed to increase the frequency of cross drains on the road. Distances between relief pipes will generally not exceed 200 to 250 feet.

e. The grade of outsloped and insloped roads will be varied with graded rolling dips, drivable dips, or drivable waterbars to frequently cross drain surface water and to safely return water to stream channels in the event that a culvert plugs.

f. Gravelling will be used on native road surfaces to reduce surface erosion - especially near stream crossings. A minimum of a 4 inch lift is recommended.

g. During and following operations on out sloped roads, retain out slope drainage and remove berms on the outside except those intentionally constructed for protection of road grade fills.

h. Construct cross drains and relief culverts to minimize erosion of embankments. Minimize the time between construction and installation of erosion control devices. Use riprap, vegetative matter, downspouts and similar devices to minimize erosion of the fill.

i. Prior to fall or spring runoff, install drainage structures or cross drain uncompleted roads that are subject to erosion.

j. Install relief culverts at a minimum grade of 1 percent greater than road gradient.

k. Energy dissipaters or downspouts will be placed below problem culvert outlets (Reconstruction item).

l. Roads restricted after use will also have erosion control measures in place prior to final pull-out. Roads to be closed by any closure device other than a gate or guardrail will be decommissioned.

PRACTICE 15.14 - *Diversion of Flows Around Construction Sites*

OBJECTIVE: To minimize downstream sedimentation by insuring that all stream diversions are carefully planned.

EFFECTIVENESS: High

COMPLIANCE: Meets SCA Rules

IMPLEMENTATION: Flow in streamcourses may only be diverted if the Forest Service deems it necessary for the contractor to meet contractual specifications. Such a diverted flow shall be restored to the natural stream course as soon as practicable. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment.

PRACTICE 15.21 - *Maintenance of Roads*

OBJECTIVE: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

EFFECTIVENESS: Moderate

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: For roads in active timber sale areas standard TSC provisions require the Purchaser to perform or pay for road maintenance work commensurate with the Purchaser's use. Purchaser's maintenance responsibility shall cover the before, during and after operations period during any year when operations and road use are performed under the terms of the Timber Sale Contract. All maintenance work shall be done concurrently, as necessary, at least to the following minimum standards:

1. Culverts and ditches shall be kept functional.

2. During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or waterbarred, and berms removed from the outside edge except those intentionally constructed for protection of fills.

3. The road surface shall be maintained as necessary to minimize erosion of the sub-grade and to provide proper drainage.

4. If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams.

5. Sidecast of all material associated with road maintenance will be done in a manner to prevent its entry into streams.

6. Slumps, slides and other erosion features causing stream sedimentation will be kept repaired and stabilized.

More specifications are included under “Required Design Criteria for All Action Alternatives”.

PRACTICE 15.25 - Obliteration of Temporary Roads *(and Obliteration of System Roads)*

OBJECTIVE: To reduce sediment generated from temporary roads by decommission or obliterating them at the completion of their intended use.

EFFECTIVENESS: High

COMPLIANCE: Meets FPA Rules

IMPLEMENTATION: Effective obliteration is generally achieved through a combination of the following measures:

1. Recontouring stream crossings to natural gradient and width restoring full floodplain and valley features to natural contour.

2. Recontour unstable fill or cutslopes to natural contours. Decompact the bench portion of the road prism a minimum of 14 inches before placing excavated fill against the cutslope and on the prism.

3. Provide adequate cross drainage for the road. Waterbars placed on a maximum spacing of 30 feet will be the primary means of cross draining roads with stable cut and fill slopes. Outsloping will be the primary means of cross draining unstable road segments.

4. Roads will be returned to resource production through revegetation. Stream crossings will be seeded with a seed mix approved for erosion prevention and covered with straw mulch. Natural regeneration of grass, brush, and trees can usually be relied upon to revegetate the portions of the road prism between stream crossings. Available or recruited wood debris, vegetation, and slash will be used to promote revegetation and protection of disturbed soil surfaces.

PRACTICE 18.02 - Formulation of Fire Prescriptions
PRACTICE 18.03 - Protection of Soil and Water form Prescribed Burning

OBJECTIVE: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients and debris from entering surface water.

EFFECTIVENESS: High

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellant tendencies as part of the environmental analysis. Some of the techniques used to prevent soil erosion and water quality degradation are:(1)

construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

1. Foaming agent will not be used anywhere in the project area where it could be delivered to intermittent or perennial streams.

2. Machine constructed firelines will not be used on the sensitive landtypes displayed in the Environmental Assessment.

3. Firelines must be frequently waterbarred (not to exceed 50 foot spacing when going up and down the hill).

4. Maintain large organic debris appropriate to the habitat type (see "Managing Coarse Woody Debris in the Forests of the Rocky Mountains" by Graham et. al. 1994).

5. Limit prescribed burning to those times when surface soil moisture is above 25 percent to reduce the potential for damage from hot burns.

Appendix H

Issues Presenting Minimal Risk to Beneficial Uses or Eliminated by Project Design

Potential Issues	Rationale for why this is not a Principle Issue.
Inorganic Contaminants: Water quality can be reduced by contaminants such as salts or metals. These elements can be naturally occurring or can be delivered from roads that are treated with magnesium chloride or calcium chloride, which is used for dust abatement on forest roads.	The prescriptions for reducing sediment production and delivery are consistent with preventing delivery of inorganic contaminants. If the "Required Design Criteria for the Action Alternatives" were applied, then magnesium chloride or calcium chloride, which is occasionally used for dust abatement, would not create water quality concerns. Increased application of dust abatement would not be needed under the No Action alternative.
Pesticides and Herbicides: These contaminants can pose health risks to humans and other organisms.	The Forest Service has not and does not plan to use pesticides within the Canyon Creek drainage (personnel communication, Bob Denner, Jan. 2002). Herbicides may be used sparingly and judiciously in the Canyon Creek drainage on noxious weeds in accordance with the requirements of the Priest Lake Noxious Weed EIS (1997).
Organic Chemical Contaminants: Water quality can be reduced by contaminants such as industrial solvents and petroleum products. The equipment that would be used for timber harvesting, and road reconstruction and obliteration uses the largest quantities of these products and pose the greatest risk.	The "Required Design Criteria For The Action Alternative" would reduce the risk of spilling and delivering these contaminants to the stream network. Under the No Action alternative, the potential for spilling organic chemical contaminants would not change from the existing conditions, which are at a low level of risk.

Changes in Stream Dynamic Equilibrium: Dynamic equilibrium describes a stream's ability to transport the variety of stream flows and sediment of the parent watershed while maintaining consistent relationships between channel dimension, pattern, and profile. If a stream does not maintain dynamic equilibrium, the resulting changes in channel condition and function may negatively affect the beneficial uses.	At the road #597-G road/culvert crossing, the channel immediately above and below the crossing (for approximately 150 m) is both aggraded and degraded as result of the undersized pipe. The channel conditions below this crossing (approx. 150 m) returns to a fair state of equilibrium and recovery to the confluence with the M.F. East River (see fisheries descriptions of existing habitat conditions and field reports in the project file). Photo interpretation (Chapter 3 Reference Condition Section) indicates that from a large-scale analysis, the channel has not changed in this location from 1935-1996. Field and inventory data indicate that the channel networks within Canyon Creek above the road #597-C crossing are in good condition (field surveys 2000 and 2001). When watershed and fisheries improvements are planned through opportunities, the goal should be to enhance the existing condition of the stream crossings in Canyon Creek.

Increased rain-on-snow risk: Forest management activities can alter the timing and peak of water yields from snowpacks during mid-winter rain-on-snow event. Forest management activities alter the water yield by reducing snow interception and increasing the probability of heat transfer to the snow (Coffin and Harr 1991). In some cases the size, frequency, and duration of peak flows can be increased to a point that stream channel conditions and support of the beneficial uses can be negatively affected.	On the Idaho Panhandle National Forests (IPNF), the rain-on-snow zone is estimated to be between 3,000 and 4,500 feet. The percentage of a watershed that lies within the transient snow zone is an important factor of rain-on-snow flooding susceptibility (Kjelstrom and Moffatt 1981). The North Zone Geographical Assessment (NZGA - Draft) characterized the sensitivity of specific drainages to rain on snow events. The NZGA used elevation as the most useful and effective physical watershed variable to characterize the sensitivity. According to the NZGA, roughly 50 percent of Canyon Creek lies within this zone. Typically watersheds that are responsive to rain-on-snow events have 40 percent or more of their watershed area in the rain-on-snow zone. A review of historic stream gaging data in the Priest River Basin indicate that the largest percent of total flow and maximum instantaneous peaks occur during spring runoff events in April, May, and June. (Priest River Gage at RM 3.8 and Benton Creek gage) The nearest gagged stream to the project area is located within the Experimental Forest at Benton Dam. This gagged stream is immediately adjacent to the Canyon Creek drainage. A review of the hydrograph for the Benton Stream gage shows that the streams in this area are not responsive to typical rain on snow events, but rather the peak streamflows are associated with spring runoff. Thus flows derived from spring snowmelt (not late fall or winter rain-on-snow events) comprise the dominant channel forming and maintenance events.

Decreases in Base Flows: Roads and harvest can decrease base flows by concentrating surface runoff, which increases runoff and minimizes groundwater recharge. Maintaining baseflows is an important issue to maintaining fish habitat.	The action alternative is not expected to measurably change snowmelt and runoff patterns. However, the proposed road obliteration/storage and road maintenance work would minimize the concentration of water and encourage recharge of the groundwater. A greater portion of the snowmelt and rain would be allowed to naturally infiltrate to the groundwater instead of running off as surface water. The increased groundwater recharge would make more water available for base stream flows in the summer and fall when water demands are highest.
Stream Temperature: Stream temperature is one of the pollutants of concern for which the mainstem of the East River and the Middle Fork of the Priest River are listed under the 303(d) list.	Riparian buffer strips protect water quality and fish habitat by moderating stream temperatures (Belt and O'Laughlin 1994). As part of the requirements of INFS (1995), stream buffers were prescribed as part of the design criteria for this project. These buffers will be adhered to unless otherwise stated through project design and mitigation or goals of the specific research objectives.
Changes in Riparian Condition and Function: Riparian areas influence stream conditions and water quality in many ways, including filtering sediment, and providing shade, large organic debris, bank stability, and sources of energy for aquatic biota (Belt and O'Laughlin 1994). Improperly designed and/or poorly maintained roads and timber harvesting can reduce this functionality. Under natural conditions, the riparian zone is a place of dynamic change whether the catalyst of change is a flood or fire or a blowdown event.	The proposed action alternative has been designed to meet INFS (1995) standards and guidelines. No harvesting activities would occur within the RHCAs under any of the alternatives. The only proposed activities within RHCAs are culvert replacements, road obliteration projects at stream crossings, and an experimental prescribed burning. None of these activities would be expected to change the natural riparian condition and function. The culvert replacements and road obliterations would be an immediate benefit to the riparian zone. The controlled burning within the riparian zone of unit 6 would provide an opportunity to document scientifically the effects of burning on portions of the riparian zone as natural as fires occurred within this project area. No burning would occur unless soil moisture was optimum to prevent damage to the soil and residual tree species. It is anticipated that a light burn in the riparian zone may stimulate the growth of grass and forbs.

Consistency Checklists and Regulatory Requirements

FOREST PLAN STANDARDS AND AMENDMENTS

Water (IPNF, II - 33)

1. Management activities on Forestlands will not significantly impair the long-term productivity of the water resource and ensure that state water quality standards will be met or exceeded.

The degree to which the alternatives meet this criterion is discussed under the "Direct and Indirect Effects of the Action Alternative", "Cumulative Effects to of the Action Alternative"", and the "Consistency with the Forest Plan" sections in Chapter 4.

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 maintenance (either retention or restoration maintenance) are implemented. The Action Alternative (Alternative B) would reduce production and potential for delivery of sediment to streams. Petroleum products used in the operation and maintenance of heavy equipment are the primary chemical constituents, which could be delivered 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 were selected.

3. Implement project level standards and guidelines for water quality contained in the Best Management Practices (Appendix S, IPNF-Forest Plan), including those defined by State regulation or agreement between the State and Forest Service such as:

a. Idaho Forest Practices Rules
b. Rules and Regulations and Minimum Standards for Stream Channel Alterations
c. Best Management Practices for Road Activities.

Specific road maintenance and repair is needed for Alternatives A to be consistent with Idaho Forest Practices Rules. The action alternatives are consistent with this criterion. In addition to standard State BMP's, other soil and water conservation practices that are approved BMP's are built into the timber sale contract. Site specific "Required Design Criteria for All Action Alternatives,

and BMP's in (Appendix B) Management Practices" are specified and are listed in this report. 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. Stream crossing upgrades would meet minimum standards for stream channel alterations and are covered under a Memorandum of Understanding with the State of Idaho.

4. Cooperate with the states to determine necessary instream flows for various uses. Instream flows should be maintained by acquiring water rights or reservations.

Instream flows are not an issue with any of the proposed research objectives. Therefore, this standard is not applicable to any alternative.

5. Manage public water system plans for multiple use by balancing present and future resources with public water supply needs. Project plans for activities in public water systems will be reviewed by the water users and the State.

Streams not defined as public water systems, but used by individuals for such purposed, will be managed to standards established by the state's forest practices rules and/or the National Forests' BMPs or to INFS standards and guidelines whichever is applicable.

The Division of Environmental Quality (DEQ), the Idaho Fish and Game, and the Idaho Department of Lands were included in scooping letter correspondence. State and site-specific standards, and INFS standards are specified and would be applied. Factors that put water quality at-risk were identified as well as what can be done to minimize or eliminate those risks. There are no domestic water sources located within Canyon Creek nor within the analysis area titled the "Face" area.

6. Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota. Maintenance of existing biota will be defined as maintaining the physical integrity of these streams. Best Management Practices (Appendix S), INFS (replaces Forest Plan - Appendix 0), and riparian guidelines will be used to accomplish this objective.

Protection of the integrity of riparian conservation areas (which includes first and second order streams) was approached through alternative design strategies and specified actions in the "Required Design Criteria for All Action Alternatives" and BMP's (Appendix B). Alternatives meet this standard as specified in the Chapter 4 effects discussions for Aquatics.

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. The models will be used in conjunction with field data, monitoring results, continuing research and professional judgment, to further refine estimated effects and to make recommendations.

All alternatives meet this standard. WATSED was used to characterize current conditions for water and sediment yield in the Canyon Creek drainage. Stream crossing risk was also quantitatively evaluated and summarized by cumulative effects area (see project file for results). Information from past research was used and referenced in this analysis. Additionally, other sources of information described under "Data Collection" and "References Cited" sections of this report were used to further refine estimated effects and to make recommendations.

CLEAN WATER ACT

Army Corp Discharge, Dredge and Fill Permits:

The proposed harvesting and road maintenance would not affect wetlands or streams. The proposed stream crossings upgrades proposed for under “Watershed and Fisheries Improvement Opportunities” are covered under the "silvicultural road exemption" of the nationwide permit. No wetlands would be affected by the reconstruction work.

Water Quality Limited Stream Segments (WQLS):

The East River was added to the 1994 303(d) list, and retained on the 1996 list, as a result of EPA analysis of the 1992 Idaho 305(b) report, in which IDFG evaluated coldwater biota as partial support and salmonid spawning as not supported. The 1998 303 (d) list challenged the boundaries of the East River and the result was the North Fork and East River were retained on the list and the Middle Fork was delisted. The listed pollutants for the East River and the North Fork are sediment, DO, temperature and flow. Canyon Creek is not listed as a WQLS stream.

Antidegradation Policy for Beneficial Uses:

Application of the antidegradation policy is described in Chapter 4 under “Consistency with the Forest Plan”. The effects analysis in Chapter 4 describes the anticipated effects for each alternative.

INFS Standards and Guidelines (USDA A7-13; 1995)

The Forest Plan for the Idaho Panhandle National Forests provides management goals and objectives for the protection of the fisheries resource. The Inland Native Fish Strategy (INFS) amended the IPNF Forest Plan management area direction in August 1995, and added standards and guidelines to protect water and aquatic biota. Riparian Habitat Conservation Areas (RHCAs) are portions of watersheds where riparian-dependent resources receive primary emphasis and where management activities would follow these standards and guidelines. Only INFS standards and guidelines that apply to the range of alternatives for the Canyon Creek Research Project were addressed here; those standard and guidelines that do no apply were added into 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 RHCA's", no timber harvest activities are proposed under the action alternatives within RHCA's in the project area, therefore this standard does not apply.*

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.

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.

This project area is not within an INFS priority watershed nor are any new roads or landings proposed within RHCAs..

b. minimizing road and landing locations in Riparian Habitat Conservation Areas.

No new roads or landings are proposed within RHCAs under the action alternatives. Therefore, all alternatives meet this standard.

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.
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 by requirements implemented by the Roads Analysis Process. The proposed road maintenance, reconstruction and decommissioning from this process are displayed in Appendix B.

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 infeasible or unsafe.

This standard would apply under road reconstruction for road realignment. In addition, recommendations are made which would cross drain ditchlines before entering stream channels and prevent diversion of streamflow down the road prism if a culvert fails.

2. Route road drainage away from potentially unstable stream channels and hillslopes.

This standard was applied by improving cross drainage of haul routes. This will reduce the potential to concentrate water and deliver it to unstable slopes (primarily stream breaklands) below the road. Provided that road improvements in the action alternatives are conducted for No Action, the alternative meets this standard.

e. avoiding disruption of natural hydrologic flow paths.

Restoring slope hydrology would be accomplished through road maintenance that includes road retention and restoration, which would frequently cross drain ditches, route road surface water, and aid in the prevention of channel flow diversion down the road prism. The proposed road decommissioning/storage would also restore natural hydrologic flow paths.

f. avoiding sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.

None of the proposed research objectives are within priority watersheds, but this is a standard BMP included in the timber sale contract.

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 Chapter 2, 3, and 4 originate from the above standards. The action alternatives would meet this standard. No Action would meet this standard if the needed reconstruction and maintenance were accomplished.

RF-4 Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-vear 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 maintenance and decommissioning described in Chapter 3 and 4 originate from the above standard. The action alternatives would meet this standard. No Action would meet this standard if needed reconstruction, maintenance, and/or decommissioning were accomplished.

RF-5 Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

The crossing on the mainstem of Canyon Creek (road # 597-G) exists as a potential fish barrier during high flows. This road would not be used as a haul route for research objectives, but is within the analysis area. This crossing would be improved as discussed under "Watershed and Fisheries Improvement Opportunities" in Chapter 2. No Action would meet this standard if needed reconstruction, maintenance, and/or decommissioning were accomplished.

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 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.

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 Riparian Habitat Conservation Areas are significantly damaged by a wildfire or a prescribed fire burning out of prescription.

The proposed fires/fuels management described in Chapter 2, 3, and 4 originate from the above standards. Unit 6 research objectives are designed to minimize disturbance of riparian ground cover and vegetation. The action alternatives would meet this standard. No Action would not meet this standard if wildfire without suppression were allowed.

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 affect instream flows, therefore, this standard does not apply.

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.

None of the alternatives propose tree falling within the RHCAs so this standard does not apply.

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.

Provided the BMPs and weed prescriptions listed in the Priest Lake Noxious Weed EIS are followed, all alternatives would meet this standard.

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. Refueling sites within a Riparian Habitat Conservation Area must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.

This is a standard BMP that is part of the timber sale contract; and is also noted within Chapter 4 under required design for all action alternatives – Hazardous Materials.

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.

Drafting of water would only be needed for prescribed fire operations. The amount of water needed for these operations would not significantly affect fish or instream flows. The use of foaming agents would not occur near stream channels.

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.

The proposed watershed opportunities as described in Chapter 2, 3, 4 originate from the above standard. The action alternatives would meet this standard. No Action would meet this standard if the needed restoration projects were accomplished.

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.

Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project and that future resource management will develop a CRMP for the Priest River system.

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.

The proposed road decommissioning and maintenance described in "Design Criteria" in Chapter 2 and in "Chapter 3-Watershed and Fisheries Improvement Opportunities" originate from the above standard.

FW-2 Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. For existing fish and wildlife interpretive and other user-enhancement facilities inside Riparian Habitat Conservation Areas, assure that Riparian Management Objectives cannot be met and adverse effects on inland native fish are avoided. Where Riparian Management Objectives cannot be met or adverse effects on inland native fish avoided, relocate or close such facilities.

There is no user-enhancement facilities located or proposed and is not an issue within the proposed project. Therefore, this standard is not applicable to any alternative.

FW-3 Cooperate with Federal, Tribal, and State wildlife management agencies to identify and eliminate wild ungulate impacts that prevent attainment of the Riparian Management Objectives or adversely affect inland native fish.

Wild ungulate impacts will not prevent attainment of RMO's, so this standard does not apply.

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 RHCA's for the project activities, habitat manipulation does not apply. Fish stocking, harvest and/or poaching are all regulated by State management guidelines.

FOREST PLAN STANDARDS - Fish

Fish – Forest Plan (IPNF, II – 29-31)

1. Activities on National Forest lands will be planned and executed to maintain existing water uses. Maintain is defined as "limiting effects from National Forest activities to maintain at least 80 percent of fry emergence success in identified fishery streams." The percent is measured from pristine conditions. Current methodology will not detect an impact of less than 20 percent. During the life of the plan, new technologies may permit more precise assessments; however, the goal of this standard will remain as "to maintain 80 percent of fry emergence success.

The IPNF Forest Plan (1987) contains standards for fry emergence that are no longer valid since the Inland Native Fish Strategy (1995) 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 Fisheries/Watershed Analysis to determine effects of land management activities on fry emergence is described in Appendix I (I-1, 2).

Appendix I requires that if, during the environmental assessment process, that 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 (J. Kershner, personal communication). In addition, the use of fry emergence survival (regardless of the threshold) as a surrogate for viability came into question, primarily for two reasons:

- *First, fry emergence is highly variable. This can be due to changing natural conditions (e.g., floods, temperature regimes, geology) or human-induced causes (e.g., increased sediment input, chemical spills). Both agents are at work in most cases so it is difficult to determine what proportion of egg-to-fry mortality is due to each cause. As a result the*

underlying relationship between sediment in redds and survival is difficult to predict (Chapman 1988).

- *Second, and more important, egg-to-fry mortality is usually density-independent (i.e., a percentage of fry will survive regardless of the number of eggs). This means that in most cases there are enough fry to inhabit all available habitat within a stream. Therefore fry-to-smolt (sub-adult) survival, where density dependent mortality plays a significant role, is a more effective and appropriate predictor of population viability than egg-to-fry survival (for a review of these concepts see Hilborn and Walters 1992). Currently the indicator used as a surrogate of fry-to-smolt survival is stream habitat characteristics.*

The 1989 Forest Plan Evaluation and Monitoring Report documents the change away from 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 supercedes 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 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).

2. Streams providing spawning and rearing habitat, which are considered critical to the maintenance of river and lake populations of special concern, will be managed at a standard higher than the 80 percent standard. Monitoring will be needed to detect this higher standard. "*High Value Streams*"

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 2 & 3 are not inclusive to this analysis because no streams in the analysis area are listed under "high value streams" or "low access fishing streams." However, streams within the analysis area, as listed in Chapter 3 are recognized as to providing beneficial uses. Also, in standard #2 above, please note the explanation provided under standard #1 for fry emergence.

4. Provide fish passage to suitable habitat areas, by designing road crossings of streams to allow fish passage or removing in-stream migration barriers.

Within the analysis area, man-caused fish migration barriers have been identified in Chapter 2 on those streams supporting salmonid species (see "Watershed and Fisheries Improvement Opportunities) and mitigation measures are established to eliminate such barriers.

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 3, but emphasized here; 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 Department of Environmental Quality (DEQ) 'BURP", Idaho Department of Fish and Game (IDF&G), the United States Fish and Wildlife Service (USFWS), Department of Environmental Quality (DEQ) 'BURP" studies and comprehensive knowledge of the fisheries resources in the Priest River Basin. As mentioned opportunities exist that may remove known fish migration barriers and reduce the potential of mass failure.

6. Coordinate management activities with water resource concerns as described in MA 16, Appendix I and Appendix O.

- *The INFS amendment to the Forest Plan describes how management should be conducted within MA-14;*
- *MA-14 for fisheries management objectives, see response in Forest Plan fish standard #1 for detailed information;*
- *Appendix I – see response in Forest Plan fish standard #1 for detailed information; the four standards, analysis, and the points beneath them in Appendix I are in part or whole analyzed in detail within the framework of Chapters 1-4, Fisheries BA, the matrix, and the Appendices.*
- *Appendix O – "Riparian Management along Headwater Streams"---See specific INFS Standards and Guidelines.*

State of Idaho Governor's Bull Trout Plan

The following describes a "step down" process from the Governors Bull Trout Plan.
Governors 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. The Technical Advisory Team's role is to assist the WAG with issues regarding recovery of bull trout in each key watershed.

Lake Pend Oreille Bull Trout Conservation Plan (Final Draft; LPOWAG July 1999)

- Watersheds were ranked by the TAT based on the following criteria:
  - The probability of persistence for bull trout;
  - Current habitat/watershed conditions;
  - The need for watershed restoration and/or protection;
  - The potential to increase bull trout numbers.
- Low priority watersheds are those subwatershed streams that have no recent bull trout sightings documented, or streams that never produced bull trout as far as historical data shows. The list of low priority watersheds also contains streams that have limiting factors that can only be removed with significant investment.
- Streams were listed as High Priority watersheds for restoration.
- The conservation plan emphasizes restoration activities in High Priority watersheds only. Medium and Low Priority watersheds do not yet have associated restoration actions.

The Final Draft of the Lake Pend Oreille Bull Trout Conservation Plan was forwarded to the Governor's office as the final plan. The WAG has not regrouped to implement the plan; however, many of the restoration activities are being

accomplished through other means (Dave Mosier, personal communication, 2001).