United States
Department of
Agriculture

Forest Service

Northern Region

April 2002

Idaho Panhandle National Forests
Coeur d'Alene River Ranger District

Missouri Heli Bug
Environmental Assessment

MISSOURI HELI BUG ENVIRONMENTAL ASSESSMENT

April 2002

IDAHO PANHANDLE NATIONAL FORESTS
Coeur d'Alene River Ranger District
Shoshone County, Idaho

Lead Agency: USDA Forest Service
Coeur d'Alene River Ranger District
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ABSTRACT

A small timber management project has been proposed in the Missouri Gulch and Scott Creek areas within the Beaver Creek drainage in a portion of sections 8 and 9, of T491N, R4E, Boise Meridian. The project area is within Forest Plan Management Area 1. Under the direction for Management Area 1, this area is to be managed for commercially valuable timber products while providing for wildlife habitat and the protection of other resources. Activities are proposed which would allow recovery of the economic value of dead and diseased timber and promote long-term vegetative restoration in areas of low residual stocking levels.

This environmental assessment describes three alternatives to meet the purpose and need. Alternative 1 is the No-Action Alternative (there would be no change from the current approach). Under Alternative 2, the proposed action, harvest would occur on approximately 55 acres. Harvest treatments would range from individual tree selection harvest (19 acres) to group shelterwood and irregular shelterwood harvest depending on the level of mortality and the amount of healthy green timber currently on the sites (36 acres). Under Alternative 3, harvest would occur on 40 acres with individual tree selection harvest (19 acres) and group shelterwood harvest (21 acres). The difference between the two action alternatives is that Alternative 2 treats some areas of root disease and white pine blister-rust mortality between several beetle mortality areas whereas Alternative 3 only treats the beetle-affected areas. No new road construction or reconstruction would be considered under either alternative.

COEUR D'ALENE RIVER RANGER DISTRICT
MISSOURI HELI BUG
ENVIRONMENTAL ASSESSMENT

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CHAPTER 1
PURPOSE AND NEED FOR ACTION

1.1 OVERVIEW OF THE AREA

The Missouri Heli Bug Project Area is located within the Missouri Gulch drainage of the Beaver Creek watershed on the Coeur d'Alene River Ranger District (please refer to the alternative maps provided in Chapter 2). The project area encompasses approximately 937 acres, all National Forest System lands. The Forest Plan Management Area within the Missouri Heli Bug Project Area includes goals to manage suitable lands for timber production for the long-term growth and production of commercially valuable wood products. There are no lands in or adjacent to the Missouri Heli Bug Project Area identified as roadless (Management Area 10) under the Forest Plan.

Timber harvest, mining and road building have occurred throughout the watershed. Douglas-fir, grand fir and hemlock are the dominant cover types in the area. The greater portion (57%) of the area is comprised of stands that are 36 to 100 years old. Approximately 8% of the area is allocated to the management of old-growth habitat. Approximately 21% of the area is identified as demonstrating mortality caused by Douglas-fir bark beetles. Root disease openings are scattered throughout the area, with openings ranging in size from one-quarter acre to five acres. The last stand-replacing fire in the Missouri Heli Bug Project Area took place in the late 1880's. An estimated 200 miles of road traverse the area.

Numerous mine closure projects are occurring in the Beaver Creek drainage. Watershed improvement activities have occurred under several past projects, and are funded to occur under other projects.

Additional discussion of these conditions is provided in Chapters 2 and 3 of this Environmental Assessment.

1.2 PURPOSE AND NEED

Over the past several years, a widespread Douglas-fir beetle infestation has caused significant mortality to Douglas-fir trees. This mortality is scattered across the district. Two years ago, the Forest Service addressed larger areas of mortality through the Douglas-fir Beetle Environmental Impact Statement (EIS) and Record of Decision (USDA Forest Service, 1999). Smaller areas of mortality were addressed through the Small Sales EIS (USDA Forest Service, 2000). Beetle mortality in the Missouri Gulch area did not come to our attention until the summer of 2000 and was therefore not considered under either of the previous analyses.

In addition to the timber mortality and change in stand conditions as a result of Douglas-fir bark beetle in the Missouri and Scott Gulch areas, there are also small areas of low residual stand stocking levels that are the result of mortality to root disease and blister rust over extended periods of time. The opportunity exists to treat these beetle-kill and root disease areas with site preparation and planting to restore pines and larch back into the ecosystem.

The purpose of our proposal is to:

- *allow recovery of the economic value of dead and diseased timber*
- *promote long-term vegetative restoration in areas of low residual stand stocking as a result of timber mortality to root disease and bark beetles.*

1.3 PROPOSED ACTION

The proposed action (represented by Alternative 2) is to:

1) *Harvest dead and dying trees in areas attacked by bark beetles or opened by mortality to root disease and blister rust using salvage and regeneration harvest methods;*
2) *restore long-lived seral tree species such as white pine, western larch and ponderosa pine in stands where bark beetles and root disease have killed a substantial portion of the basal area of the stand, through timber harvest, site preparation, and associated planting;*

Under the Proposed Action, timber harvest and fuels treatment would occur on a total of approximately 55 acres. No road construction or reconstruction would occur under this proposal. For more specific information regarding activities of the proposed action (acres by prescription, yarding methods, fuels treatment, etc.) refer to Table II-14, the Alternative Descriptions in this chapter, and the enclosed maps.

1.4 SCOPE OF THE PROPOSAL

The scope of this environmental assessment was determined through public scoping and agency analysis, in accordance with the requirements of 40 CFR 1508.25. The scope of the actions to be addressed includes the proposed timber harvest, fuels treatment, and reforestation activities. This environmental assessment documents the analysis of site-specific, on-the-ground activities. It is not a general management plan for the Coeur d'Alene River Basin.

1.5 DECISIONS TO BE MADE

This environmental assessment is not a decision document. This document discloses the environmental consequences of implementing the proposed action or alternatives to that action. The District Ranger for the Coeur d'Alene River Ranger District is the Deciding Official. His decision and the rationale for that decision will be stated in the Decision Notice. The District Ranger will select an alternative for implementation based on:

- *the extent to which each alternative addresses the purpose and need for action*
- *consistency with the goals and findings of Forest policy and legal mandates*
- *how well each alternative responds to environmental issues and concerns identified by the public, other agencies, and Forest Service resource specialists*
- *effects of the selected alternative in comparison to other alternatives considered*

1.6 ORGANIZATION OF THE DOCUMENT

Chapter II presents the key resource issues within the area and describes the alternatives considered. Chapter III describes the existing conditions of specific resources and the changes that would occur to each resource under implementation of each alternative. Direct, indirect and cumulative impacts are discussed.

A List of Preparers identifies the individuals who conducted the analyses and prepared the environmental assessment. A List of References provides the full citation for those references noted in the environmental assessment. A list of Acronyms used in the text is provided, and the Glossary defines terms used in the text that may be unfamiliar to the reader. A list of those who will receive copies of this environmental assessment is provided, however it is likely that others will request and receive copies of the document. The Appendices contain analytical reports and specific or supplemental information that further explains discussions in the main chapters. Many more reports and analyses documentation have been referenced or developed during the course of

this project, but were not included in this document either because they were technical in nature or were of excessive length. Those items are referred to as being part of the "project files." All project files for the Missouri Heli Bug Environmental Assessment (EA) are available for review by the public. To review the files, please contact the Project Team Leader or the NEPA Coordinator at the Fernan Office of the Coeur d'Alene River Ranger District, (208) 664-2318.

1.7 PUBLIC REVIEW AND COMMENT

Comments are invited on this environmental assessment. In accordance with 36 CFR 215, and to ensure consideration in making a decision, comments must be postmarked or received 30 days from the date of publication of the legal notice in the Spokesman-Review newspaper. People who provide comments should also include their name, address, telephone number, and the organization they represent (if any); the title of the document on which the comment is being submitted; and facts and reasons specific to this proposal for the Deciding Official to consider. Comments received on the proposed project (including names and addresses of those who comment) will be considered part of the public record and will be available for public inspection. We can accept and consider comments submitted anonymously; however, people who submit anonymous comments will not have standing to appeal the subsequent decision (36 CFR 215). Any person may request that we withhold submitted comments from the public record (pursuant to 7 CFR 1.27(d)) by showing how the Freedom of Information Act (FOIA) permits such confidentiality. However, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. We will inform the requestor of the agency's decision regarding the request for confidentiality. If the request is denied, we will return the submitted comments and notify the requester that the comments may be resubmitted, with or without name and address, within a specified time.

CHAPTER 2
ALTERNATIVES

2.1. INTRODUCTION

This chapter describes the alternatives considered to achieve the purpose and need discussed in Chapter I. The National Environmental Policy Act (NEPA) requires federal agencies to "identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment" (40 CFR 1500.2(e)). This chapter discloses the sources of analysis direction and guidance, alternative development (including public involvement), features common to all alternatives (including monitoring and mitigation), comparison of alternatives and their effects, and alternatives considered but eliminated from further study.

2.2. ANALYSIS DIRECTION AND GUIDANCE

2.2.1. National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires analysis of projects to ensure the anticipated effects upon all resources within the project area are considered prior to project implementation (40 CFR 1502.16). The analysis for the Missouri Heli Bug project followed the guidelines of NEPA as provided by the Council on Environmental Quality (CEQ). Alternatives were developed based on existing conditions, Forest Plan goals and objectives, and public concerns and recommendations.

A total of three alternatives were considered in detail, including a no-action alternative as required by NEPA and NFMA. The range of alternatives is appropriate given the scope of the proposal and the purpose and need for action described in Chapter 1.

2.2.2. Natural Resources Agenda

On March 2, 1998, former Forest Service Chief Mike Dombeck announced the Forest Service Natural Resource Agenda. The Agenda provides the Chief's focus for the Forest Service, and identifies specific areas where there will be added emphasis, including:

- *watershed health and restoration*
- *forest road policy*
- *sustainable forest management*
- *recreation*

The proposed activities have been designed to be consistent with the goals and tentative direction provided under the Natural Resources Agenda to date.

2.2.3. National Fire Plan

In 2000, over 92,000 wildland fires burned more than 7.5 million acres of grass, brush and forested lands across the United States. In response, the Secretaries of Agriculture and the Interior developed an interagency approach to respond to severe wildland fires, reduce their impacts on rural communities, and assure sufficient firefighting capacity in the future. The "National Fire Plan" identifies five key program areas designed to respond to the severe wildfires of 2000, to reduce their impacts on rural communities, and to enhance firefighting capabilities in the future. In Idaho, a total of over $91.3 million has been allocated to these programs. Specific proposals were

submitted by field units (such as Ranger Districts) for consideration. The Missouri Heli Bug project is not a National Fire Plan proposal. Therefore, there is no further discussion of the National Fire Plan in this document.

2.2.4. Forest Service Road Management & Transportation System Rule

On January 28, 1998, in an Advance Notice of Proposed Rulemaking (63 CFR 4350), the Forest Service announced its intent to revise regulations concerning management of the national forest transportation system. 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. The roads policy provides basic procedural protection for inventoried roadless areas and contiguous unroaded areas from road building until the Roadless Area Conservation Rule (discussed below) becomes effective, and the Forest Service completes a forest-scale roads analysis and incorporates it into the Forest Plan.

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 (USDA Forest Service, 1999, Misc. Rep. FS-643). The six-step process does not make decisions nor allocate lands for specific purposes. Rather, the analysis identifies and addresses a set of possible issues and applicable analysis questions that, when answered, produce information for forest line officer consideration about possible road construction, reconstruction, and decommissioning needs and opportunities. Line officers must also choose the appropriate geographic scale or scales and how detailed the analysis will be. Selecting the appropriate scale for assessing road opportunities depends on the issues being analyzed and how their effects are manifested; the extent and nature of linkages with other ecological, social and economic systems; the nature of variables under the control of the decision process; the information availability and value in relation to the range of potential consequences; and budget and personnel constraints (Roads Analysis: Informing Decisions about the National Forest Transportation System, UDA Forest Service, 1999. pg. 4).

The small scope of this project did not warrant the need to do a roads analysis represented by the 6-step process just discussed. The existing transportation features were considered in the analysis. No new road development is being proposed. Road upgrades, channel site upgrades, and obliterations are being completed through the Capitol Hill Resource Project Area. Coeur d'Alene River Ranger District Access Management Environmental Assessment (USDA Forest Service, 2000) was used to identify system roads within the planning area. For additional information, please refer to the "Transportation Planning" discussion under "Issues Not Addressed in Detail in This Environmental Assessment," in Appendix A.

2.2.5. Roadless Area Conservation Rule

The Roadless Area Conservation Rule, restricting logging and road building activities in 58.5 million acres of National Forest System lands, was published in the Federal Register on January 12, 2001, with an effective date of March 13, 2001. This effective date was delayed until May 12, 2001, consistent with the Assistant to the President's memorandum of January 20, 2001. On May 4, 2001, Secretary Veneman announced that the USDA would implement the Roadless Area Conservation Rule. The U.S. District Court for the District of Idaho preliminarily enjoined the Department of Agriculture from implementing the Roadless Conservation Rule. This decision was appealed on May 21, 20001, to the Ninth Circuit Court of Appeals, which held a hearing on the merits on October 16, 2001. On June 7, 2001 in order to bring some stability to roadless area management given the legal uncertainties, Chief Bosworth informed top agency officials that he reserved unto himself with some exceptions, authority to approve road construction, road reconstruction and timber harvest project in inventoried roadless areas. Interim Directives were issued on July 27, 2001, and updated on December 14, 2001, formalizing this policy.

There are no lands in or adjacent to the Missouri Heli Bug Project Area identified as roadless (Management Area 10) under the Forest Plan. Therefore, there would be no change to road access in relation to inventoried roadless areas under any alternative.

2.2.6. Interior Columbia Basin Ecosystem Management Project

The Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (USDA Forest Service, 1996, Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin) was used as a basis for evaluating the conditions in the Missouri Bug analysis area. The assessment covered the Columbia River Basin in Washington and Oregon east of the crest of the Cascade Mountains, most of Idaho, and small portions of northern Nevada, western Montana and western Wyoming, for a total of 145 million acres. The scientific findings for the ICBEMP were released during the fall of 1996. At the Interior Columbia Basin scale, the findings for the river basins on the Idaho Panhandle National Forests show that the river basins have a low composite ecological integrity primarily due to past alterations (Integrated Scientific Assessment, page 113). In the assessment, the Missouri Bug Project Area is within an ecosystem type identified as Forest Cluster #4, with the following conclusion: "Fuel management is a priority for maintenance of hydrologic function in these subbasins. Aquatic integrity is judged low or moderate. Recovery of both aquatic and terrestrial ecosystems requires active and intensive restoration efforts. These subbasins have high restoration potential with much to gain and relatively little to lose."

Although the scientific findings of the ICBEMP are not part of the Forest Plan for the Idaho Panhandle National Forests, they are expected to provide guidance for the revision of the Forest Plan. No decisions or guidelines for analysis were made exclusively on this information; however, the science behind the ICBEMP is used in the analyses for the Missouri Heli Bug project. When available, information and direction provided in the ICBEMP Record of Decision will be reviewed to determine whether a correction, supplement, or revision to the Missouri Heli Bug EA is necessary, in compliance with Forest Service Handbook 1909.15 (Chapter 18).

2.2.7. Northern Region Overview

The Northern Region Overview and Summary (USDA Forest Service, April 1999), which covers northern Idaho and Montana, focused on priorities within northern Idaho and Montana for restoring ecosystem health and availability of recreation opportunities. The assessment describes the changes in vegetation that are contributing to the current beetle infestation.

> *"In northern Idaho and moist portions of western Montana, Douglas-fir was largely an early succession species that regenerated well after wildfire in various mixes with white pine and larch, but then was largely eliminated by root disease and beetles after 100-140 years, giving way to pine and larch. In the absence of white pine and larch, we have experienced an increase in Douglas-fir during early succession, and an apparent increase in root disease inoculum levels as succession proceeds. When Douglas-fir dies in stands now, the result is an effective 50-150 year acceleration of succession to grand fir and hemlock. This condition with heavy root disease and ladder fuels promotes and increases risk of stand-replacement fire." (Northern Region Overview Detailed Report; USDA October, 1998, page 22)*

> *"The most significant societal and ecological risk is associated with fire; particularly where ladder fuels exist or are developing near or adjacent to urban interface locations." (Northern Region Overview; USDA October, 1998, page 24)*

The Northern Region Overview Summary explores this Region's situation with regard to ecosystem health and recreation. Ecosystem health was once referred to by ecologist Aldo Leopold as the capacity of the land for self-renewal. Ecological integrity, as discussed in the Columbia Basin and step-down assessments, is the wholeness or completeness of an ecosystem, the degree to which it has all the parts and processes it needs to function properly

(Northern Region Overview Summary, USDA April 1999, pages 3-6). Characteristics of ecosystems with high integrity are:

- *Resiliency (the ability to withstand fires and other disturbances)*
- *Supportive of native and desired non-native species diversity*
- *Consist of a mosaic of well-connected habitats.*
- *Have functions (such as seed dispersal and decay) and processes (such as nutrient and water cycles) that operate effectively*

The Northern Region Overview findings conclude that there are multiple areas of concern in the Northwest Zone of the Region, but that "this subregion holds the greatest opportunity for vegetation treatments and restoration with timber sales. From a social and economic standpoint, using timber harvest for ecological restoration would be a benefit to the many communities which still have a strong economic dependency, more so than in other zones in the Region. Aquatic restoration should be focused on specific needs based on the zone aquatic restoration strategy." The timber management (timber harvest) tool best fits with the forest types in northern Idaho and is essential, for example, to achieve the openings needed to restore white pine and larch, and maintain upland grass/shrub communities. (Northern Region Overview Summary, USDA April 1999, page 9).

2.2.8. Forest Plan for the Idaho Panhandle National Forests

General management direction for the Idaho Panhandle National Forests is found in the Forest Plan, which provides Forest-wide goals and objectives (Forest Plan, Chapter II). The standards and guidelines for the Forest Plan (Forest Plan, Chapter II) apply throughout the Resource Area. The Inland Native Fish Strategy was prepared in July 1995, to provide interim direction to protect habitat and populations of resident native fish outside of anadromous fish habitat in eastern Oregon, eastern Washington, Idaho, western Montana, and portions of Nevada (USDA Forest Service, 1995). Under the authority of 36 CFR 219.10(f), the decision amended Regional Guides for the Forest Service's Intermountain, Northern, and Pacific Northwest Regions and Forest Plans in the 22 affected Forests, including the Idaho Panhandle National Forest. In development of the alternatives, standards and guidelines of the Inland Native Fish Strategy were used specifically to protect water and aquatic biota within the Resource Area. For more specific information, please refer to the discussion under "Features Common to All Action Alternatives – Features Designed to Protect Aquatic Resources" in this chapter and "Consistency With the Forest Plan and Other Legal Mandates" for Fisheries in Chapter 3.

2.2.9. Coeur d'Alene River Basin Geographic Assessment

The Geographic Assessment ("Toward an Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin," USDA Forest Service, February 1998) provides information regarding the ecological conditions specific to the Coeur d'Alene River Basin. The recommendations and strategies presented in the Geographic Assessment were based on three major groups of findings: 1) social and economic, 2) landscape and terrestrial, and 3) aquatic. The findings of the assessment are consistent with the findings of the Upper Columbia River Basin findings at the next scale down. To identify the overall strategy for the Coeur d'Alene River Basin, the terrestrial, watershed, wildlife and recreation (sense of place) maps were overlaid. The highest priority for active restoration becomes 1) non-functioning watersheds with serious terrestrial problems; and 2) functioning-at-risk watersheds with serious terrestrial problems.

The action alternatives, though small in scope, propose to reintroduce seral species such as western white pine, ponderosa pine, and larch back into the ecosystem. The geographic assessment refers to the substantial reduction that has occurred to this ecosystem component and the need to restore this vegetative component.

2.2.10. Legal Mandates

In addition to compliance with the assessments and policies described above, each resource discussion in Chapter 3 identifies the laws and regulations ("Regulatory Framework") that applies to that particular resource, and addresses how well each alternative would meet applicable legal mandates ("Consistency With Forest Policy and Legal Mandates").

2.3. REASONABLY FORESEEABLE ACTIVITIES

To address cumulative effects, activities that have a reasonable chance of occurring within the Beaver Creek watershed have been identified and considered. This helps to establish the appropriate geographic and temporal (time) boundaries for the cumulative effects analysis. The following tables display information about projects that are either ongoing or reasonably foreseeable. The analysis of effects to resources incorporated the effects of these activities as appropriate (please refer to the cumulative effects discussions for each resource in Chapter III). The tables do not include routine activities such as general fuelwood gathering, road maintenance, and existing special use permits. Past activities within the cumulative effects analysis boundaries for each resource is derived from the Timber Stand Management Records System (TSMRS). Information and maps of past harvest units within the project area are located in the Project Files – Vegetation.

Table 2-1. Ongoing General Projects.

Project	Activities	Watershed	Approximate Duration
Access Management/Travel Plan	Road and trail management	District-wide	Until next revision
Noxious Weeds	Integrated noxious weed treatment	76 sites across the district	Until 2005

Table 2-2. Ongoing Timber Projects.

Project	Activities	Watershed	Approximate Duration
Beaver Heli Bug	Timber salvage (243 total acres), fuels treatment (106 acres underburning), planting, upgrading of 2 culverts, noxious weed treatment	Beaver Creek	Timber – 12/2002 Other – 2007
Small Sales EIS	Timber salvage (257 acres), site prep burning, planting, 0.2 miles temporary road construction	Unknown, Pony, Potosi, Alder, and White Creeks	Timber – 12/2002 Other - 2007

Table 2-3. Ongoing Timber sale-related projects on closed sales.

Project	Activities	Watershed	Approximate Duration
Capitol Hill	Noxious weed treatment, 15 road closures, snag creation project	Beaver Creek	Through 2004
King's Ridge	Planting, exams, thinning 23 acres, 8 miles of road obliteration, 19 channel restoration sites	Beaver Creek	Through 2004, exams 2008
Lower White	Noxious weed treatment, exams, 2 road closures	White Creek	Through 2002, exams 2007
Unknown Pony	Planting, exams, installation of 50 bedload traps, erosion control dips on 12 miles of road, wood debris placement 20, 50 stream stepdowns, 4 road closures, browse burning on 190 acres	Unknown and Pony Gulch	Through 2003, exams 2008

Table 2-4. Ongoing Recreation Projects.

Project	Activities	Watershed	Approximate Duration
Scott Gulch Trail	Maintenance	Scott Gulch	Annual
Sunset Peak Trail	Maintenance	Beaver Creek	Annual

Table 2-5. Ongoing Grazing Allotment Projects.

Project	Activities	Watershed	Approximate Duration
Beaver Pony	Pasture permit (9 cows – occasional use)	Beaver Creek	1 year - 2002

Table 2-6. Ongoing Minerals Projects.

Project	Activities	Watershed
Graffenberger	Placer-Gold Mine – exploration, several trenches on hillside	Potosi
McPeak	Placer-Gold Mine – small production, less than 1 acre disturbance on hillside	Potosi
Miller	Placer-Gold Mine – exploration, several trenches within 300 feet of stream	Potosi
Stutzke	Placer-Gold Mine – production, less than 1 acre disturbance within 500 feet of stream	Potosi
GPAA/Curtis	Placer-Gold Mine – exploration, trench/processing within 300 feet of stream	Pony Gulch
Hulse	Placer-Gold – exploration, several trenches within 500 feet of stream	Pony Gulch
Scobey	Placer-Gold – production, small dredge in intermittent stream	Potosi
Hendricks	Placer-Gold – exploration, trench along road with no nearby streams	Potosi
Corbit	Placer-Gold – exploration, trench along road with no nearby streams	Potosi
Killian	Placer-Gold – exploration, several trenches within 200 feet of stream	Potosi

Table 2-7. Reasonably Foreseeable Timber Projects.

Project	Activities	Watershed	Approximate Duration
Hither and Yon Beetle	Timber salvage and larch thinning (60 acres), site prep burning, planting	Dobson Gulch	Timber- 12/2003 Other -2008
Beaver Creek EIS	Vegetative, aquatics, and wildlife habitat restoration	Beaver Creek	2004-2011

Table 2-8. Reasonably Foreseeable Preferred Fuelwood Gathering Projects.

Project	Activities	Watershed	Approximate Duration
Unknown Creek	Commercial fuelwood gathering	Unknown Creek	Summer 2003

Table 2-9. Reasonably Foreseeable Grazing Allotment Projects.

Project	Activities	Watershed	Approximate Duration
CDA Grazing Allotment EA	Analysis of existing grazing activities	Beaver Creek	2002

Table 2-10. Reasonably Foreseeable Minerals Projects.

Project	Activities	Watershed	Approximate Duration
Mine Closure Projects	Safety closures of numerous abandoned mine sites	Beaver Creek	Through 2005

Table 2-11. Reasonably Foreseeable TSI (Thinning) Projects.

Project	Activities	Watershed	Approximate Duration
White Peak	10 acres of precommercial thinning	White Creek	Through 2002

Table 2-12. Ongoing or Reasonably Foreseeable Timber Sale Projects on other Federal, State, and Private Ownership.

Ownership	Activities	Watershed	Approximate Duration
Louisiana Pacific	1900 acres of individual tree salvage	Missoula and Carbon Creeks	Possible annual treatment
Idaho/LA Mining and Milling	0.4 miles road construction, 1.0 miles reconstruction, 100 acres commercial thinning, line skidding	Missoula and Carbon Creeks	Through 2002
BLM	Beetle-kill salvage, 20 acres, 0.2 miles road construction	Keystone Gulch	2004

2.4. OPPORTUNITIES

"Opportunities" are activities that could complement and improve resource conditions within the project area. Such activities are not considered mandatory for project implementation, nor can we guarantee they would be implemented; they may be accomplished if funding becomes available.

Opportunities to Improve Aquatic Resources: The Missouri Heli Bug project area is within a portion of the Capitol Hill Planning Area. The Capitol Hill Project completed channel site upgrades within White and Alder Creeks. Culverts within Missouri and Scott Gulch were not found to be in need of upgrading because they were found to meet standards under the Inland Native Fish Strategy. Road 933 crosses Missouri Gulch; there is a large armored 48-inch culvert at this crossing that has been evaluated using the Q100 model and found to be adequate to handle a 100-year flood event. The channel above this crossing is not a fish-bearing stream because of high slope gradients of the stream channel. The remainders are small subdrainage features and ditch drainage structures. Completed and ongoing watershed improvements within Beaver Creek are listed within the Watershed Resources section of Chapter 3. One small section of old mining road will be surveyed to see if there is an opportunity for watershed restoration work. This segment is not within the riparian habitat conservation zone.

Opportunities to Treat Noxious Weeds: Many areas affected by the proposed activity, especially road segments and landings, will likely be surveyed and monitored to assess the establishment and spread of noxious weeds. However, the exact extent of surveying, monitoring and treatment, and the availability of funds is not

known at this time, therefore these activities are classified as opportunities. Treatments would be conducted under the guidelines of the Noxious Weed EIS for the Coeur d'Alene River Ranger District.

2.5. SCOPING AND ALTERNATIVE DEVELOPMENT

2.5.1. Scoping

The first step in environmental analysis is to determine what needs to be analyzed. To do this the NEPA outlines a process termed "scoping" (refer to 40 CFR 1501.7). This 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 or which have been covered by prior environmental review and therefore should be eliminated from detailed analysis. The public was notified of this project in several ways:

- *"Quarterly Schedule of Proposed Actions" for the IPNFs (January 2001 issue)*
- *legal ad in the newspaper of record (Spokesman-Review) dated February 16, 2001*
- *scoping letter for those that requested additional information dated February 16, 2001*

During scoping, letters were received from Bryan Bird (Forest Conservation Council), Jeff Juel (Ecology Center), and Mike Mihelich (Kootenai Environmental Alliance). Copies of their letters and Forest Service response to comments are provided in Appendix A (Public Involvement). The team has considered concerns identified by the public and incorporated their ideas whenever possible. Refer to Appendix A for a detailed discussion of public involvement efforts, how public comments led to issues and alternatives, and how public concerns were addressed.

2.5.2. Issues

There are several issues considered as factors in the decision to be made. Some are of sufficient concern to drive development of alternatives to the extent feasible within the physical, biological, and legal limits of forest management. Others were not key in developing alternative concepts, but are important for their value in assessing specific protective measures. These protective measures become features of the alternatives and/or specific mitigation measures. They have been addressed in detail either because the effects will have a bearing on the decision to be made, or because these resources are of interest or concern to the public. These include:

- *Forest vegetation*
- *Fire/Fuels*
- *Economic values (finances)*
- *Water resources*
- *Fisheries*
- *Wildlife*

Based on the assessment of effects and public comment, the agency determined that most other issues could be adequately mitigated or addressed by design features or other aspects of the proposed activities. These include:

- *Specific Threatened, Endangered and Sensitive wildlife species*
- *Other wildlife species and habitat*
- *Threatened, Endangered, Proposed, and Sensitive Plants*
- *Noxious weeds*
- *Air quality*
- *Soils*
- *Heritage resources*
- *Transportation planning*
- *Grazing allotments*
- *Public safety*
- *Social values*
- *Recreation*
- *Scenery*

A brief discussion of each of these issues is provided in Appendix A ("Issues Not Addressed in Detail").

2.5.3. Alternative Development and Modification

The "Federal Guide to Watershed Analysis - Environmental Analysis at the Watershed Scale" (USDA Forest Service, August 1995) is a process used to focus on proposed activity areas, describe current conditions, and identify possible treatment alternatives. This process was recently used for a project (the Burnt Cabin Heli Bug Project) very similar in size and scope to the Missouri Heli Bug Project, and was found to be quite lengthy and of limited value for such a small scale project. Therefore, the Missouri Heli Bug project did not use this analysis development process, but did assess watershed conditions at that scale, as disclosed in Chapter 3, Water Resources.

2.5.4. Alternatives Considered But Eliminated

During project development several proposals were analyzed but dismissed for a variety of reasons. The following section describes the proposals and the reasons they were dismissed from further analysis.

Road Construction Option

Building road and use of conventional yarding equipment (ground and line machines) generally results in a better financial return on timber proposed for harvest and results in better access for fuels treatment options. However, to access these pockets of beetle-killed timber, two new road segments would need to be constructed. This would result in approximately 1 mile of new road construction. In addition, visuals along Beaver Creek County Road would be effected by the new construction. With ongoing helicopter yarding in the vicinity, helicopter with a mix of conventional systems was determined to be a reasonable alternative to road construction.

Salvage Harvest Only

Timber removal under the proposed action is primarily based on salvage of beetle-killed timber. In areas where over 50% of the timber has been killed and logical treatment units can be established, regeneration units are proposed. In the project area, a salvage-only alternative did not display any significant change in loss of canopy between it and alternative 3. Therefore the only change was whether to plant the sites or allow the area to regenerate naturally. This was not enough difference to drive a separate alternative.

Watershed Restoration Only

The Missouri Heli Bug project proposal is the result of recent Douglas-fir bark beetle mortality. The purpose and need is to allow recovery of the economic value of dead and diseased timber, reduce fuels in areas of timber mortality to lower fire hazard, and to promote long-term vegetative restoration in areas of low residual stand stocking as a result of timber losses to root disease and beetle mortality. The project is small in scope and there are no watershed restoration sites within the project area that are considered high priority or that would provide a good return for the investment. In addition, this project area falls within a previous analysis area of a larger scale (Capitol Hill Planning Area). Forest vegetation restoration has been completed, along with watershed restoration that included road obliteration, channel site removal, and the upgrade of culvert and channel sites along existing system roads. Based on these conditions, a watershed restoration-only alternative was not developed.

2.6. ALTERNATIVE DESCRIPTIONS

2.6.1. Description of the Alternatives

The following table displays the amount of harvest by silvicultural prescription, fuels treatment, and yarding methods that would occur under each of the alternatives. Please refer also to the following alternative descriptions, alternative maps and the Project Files for additional information.

Table 2-13. Proposed activities, by alternative.

Feature	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3
Total Proposed Harvest (Acres):	**0**	**55**	**40**
Salvage	0	19	19
Group Shelterwood (with planting)	0	3	21
Irregular Shelterwood (with planting)	0	33	0
Total Proposed fuels treatment (Acres)	**0**	**55**	**40**
Lop and scatter	0	19	19
Underburning	0	36	21
Yarding Systems (Acres)			
Cable	0	16	16
Helicopter	0	36	21
Tractor	0	3	3
Expected Harvest Volume:			
Timber volume (CCF) *1*	0	890	502
Timber volume (MBF) *2*	0	445	251

1 CCF = 1 cunit (one hundred cubic feet)
2 MBF = thousand board feet

Alternative 1 (No Action)

The No-Action Alternative is required by NEPA and NFMA. Under this alternative, none of the proposed activities would occur at this time. There would be no change from current management direction or from the level of management intensity in the area. Implementation of the foreseeable activities identified earlier in this chapter would still occur. Because there would be no recovery of the economic value of damaged timber, no improvement in the vegetative resources, and no reduction in risk of wildfire, this alternative would not meet any of the specific objectives of the Forest Plan and Geographic Assessment identified for this project. The No-Action Alternative was analyzed in detail to display the effects of not meeting these objectives, and to compare against the action alternatives.

Alternative 2 (Proposed Action)

From a vegetation standpoint, the objective of this alternative is to harvest dead and dying trees in areas attacked by bark beetles. Some green trees between concentrations of beetle activity will be removed in order to promote the environment needed to re-introduce long-lived seral species to the area. In stands where bark beetles and root disease have killed a substantial portion of the basal area of the stand, the objective is to restore long-lived seral tree species such as white pine, western larch and ponderosa pine. Not all beetle-killed patches or root disease areas in the project area would be treated. Some small patches of beetle-killed trees would be retained for wildlife habitat or would be retain in Riparian Habitat Conservation Areas (RHCA) for woody debris recruitment.

In stands where beetle and root disease mortality is generally light, harvest treatment would salvage trees killed by bark beetles (this includes trees that are attacked by beetles that have crown symptoms indicating the trees will die) and associated trees fading to root disease or other pathogens. Additional incidental green trees may need to be removed to allow for safe felling practices or removal of trees significantly damaged during the harvest

operation. Three areas ranging from 2 to 6 acres in size would be scheduled for this salvage type treatment for a total of 19 treatment acres. Approximately 5 of these 19 acres actually have high mortality to beetles but are only being planned for salvage treatment due to size and location of the units. Fuels would be treated by lop and scattering to get this material on the ground where it will decompose quicker. These salvage units would not change stand structure or species composition on these sites.

In stands where beetle, root disease, and blister-rust mortality is more severe (generally over 50% loss of overstory basal area) regeneration harvest would be used. These regeneration treatments would be group or irregular shelterwood harvests depending on the amount of healthy overstory remaining. Irregular shelterwood harvests would have a higher residual overstory component on the site than group shelterwood harvests. This because the irregular shelterwood prescription would be implemented over some acres that were less affected by bark beetle mortality. Some green trees may be removed from these stands in order to create a suitable environment for the establishment of seral species. These areas will be underburned to consume logging slash, reduce competing vegetation, and prepare the sites for planting of white pine, larch, and ponderosa pine. The harvest treatment will be similar to salvage units with the desire to leave all the large healthy overstory trees on site. However, smaller trees not expected to survive an underburn will be harvested. Generally this would be Douglas-fir trees under 16 inches in diameter and grand fir trees under 18 inches in diameter. All healthy western white pine, western larch and ponderosa pine expected to survive an underburn will be retained.

In stands with large areas of 50% or less of the live basal area remaining as a result of beetle, root disease, and blister rust mortality, a regeneration harvest would be used to create conditions suitable for the establishment of pines and larch regeneration. The emphasis would be on retention of groups of large healthy overstory trees to maintain visual quality objectives on the sites. Smaller green trees that are not expected to survive underburning in these stands would be harvested unless retained for wildlife habitat. Generally, healthy western larch, ponderosa pine and Douglas-fir over 16 inches in diameter and healthy white pine and grand fir over 18 inches in diameter would be retained on site. Logging slash, competing brush, and fir regeneration would be burned prior to planting with desired seral species. The regeneration harvests would range from group to irregular shelterwood treatments depending on the amount of large healthy green component on site. Generally, 20-30% of the stand basal area would be retained in group shelterwood harvests with 30 to 40% retention for the irregular shelterwood. Both these types of harvest treatments are designed to leave the best trees on the site without regard to spacing of leave trees. Some small green timber between areas of mortality would be harvested to accomplish fuels treatment and site preparation objectives for reintroduction of long-lived seral species to the stands.

Table 2-14. Specific Unit Information, Alternative 2.

Unit	Acres	Prescription	Volume (mbf)	Yarding	Fuels	Planting
1a	2	Salvage	6	Cable	Lop & Scatter	None
1b	2	Salvage	6	Cable	Lop & Scatter	None
1c	4	Salvage	20	Cable	Lop & Scatter	None
2/3	18	Irregular Group Shelterwood	180	Helicopter	Underburn	White Pine/ Western Larch/ Ponderosa Pine
4	6	Salvage	30	Cable	Lop & Scatter	None
5	3	Group Shelterwood	24	Cable	Slash/Underburn	White Pine/ Western Larch
6/8	15	Irregular Group Shelterwood	150	Helicopter	Leave tree protection/Underburn	White Pine/ Western Larch
7	3	Salvage	15	Tractor	Lop & Scatter	None
9	2	Salvage	14	Helicopter	Lop & Scatter	None

Alternative 3

The objective of Alternative 3 is to salvage dead and dying trees in areas with beetle mortality. Units would not be expanded to treat root disease and blister rust mortality areas, however trees fading from those causal agents would be salvaged within the beetle-killed areas. Stands with over 50% of live basal area remaining would be scheduled for an individual tree selection harvest to salvage the dead and dying timber. Units of this harvest type would range from 2 to 7 acres in size for a total of 19 acres. Fuels would be treated by lop and scatter methods. No planting would occur.

In stands where 50% or less of the live basal area is remaining, a group shelterwood regeneration harvest would be used to create conditions suitable for the establishment of long-lived seral species. These openings would be underburned and planted with pines and larch. The emphasis would be on retention of groups of large healthy overstory trees to maintain visual quality objectives on the sites. Smaller green trees that are not expected to survive underburning in these stands would be harvested unless retained for wildlife habitat. Generally, healthy western larch, ponderosa pine and Douglas-fir over 16 inches in diameter and healthy white pine and grand fir over 18 inches in diameter would be retained on site. Logging slash, competing brush, and fir regeneration would be burned prior to planting with desired seral species. These group shelterwood harvests would retain approximately 20-30% of the overstory basal area. These harvests would range from 3 to 5 acres in size for a total of 21 acres.

Table 2-15. Specific Unit Information, Alternative 3.

Unit	Acres	Prescription	Volume (mbf)	Yarding	Fuels	Planting
1a	2	Salvage	6	Cable	Lop & Scatter	None
1b	2	Salvage	6	Cable	Lop & Scatter	None
1c	4	Salvage	20	Cable	Lop & Scatter	None
2	5	Group Shelterwood	35	Helicopter	Underburn	White Pine/ Western Larch/ Ponderosa Pine
3	3	Group Shelterwood	21	Helicopter	Underburn	White Pine/ Western Larch/ Ponderosa Pine
4	7	Salvage	35	Cable	Lop & Scatter	None
5	3	Group Shelterwood	24	Cable	Underburn	White Pine/ Western Larch
6	5	Group Shelterwood	40	Helicopter	Underburn	White Pine/ Western Larch
7	3	Salvage	15	Tractor	Lop & Scatter	None
8	5	Group Shelterwood	35	Helicopter	Underburn	White Pine/ Western Larch
9	2	Salvage	14	Helicopter	Lop & Scatter	None

Figure 2-1. Alternative 2 Map.

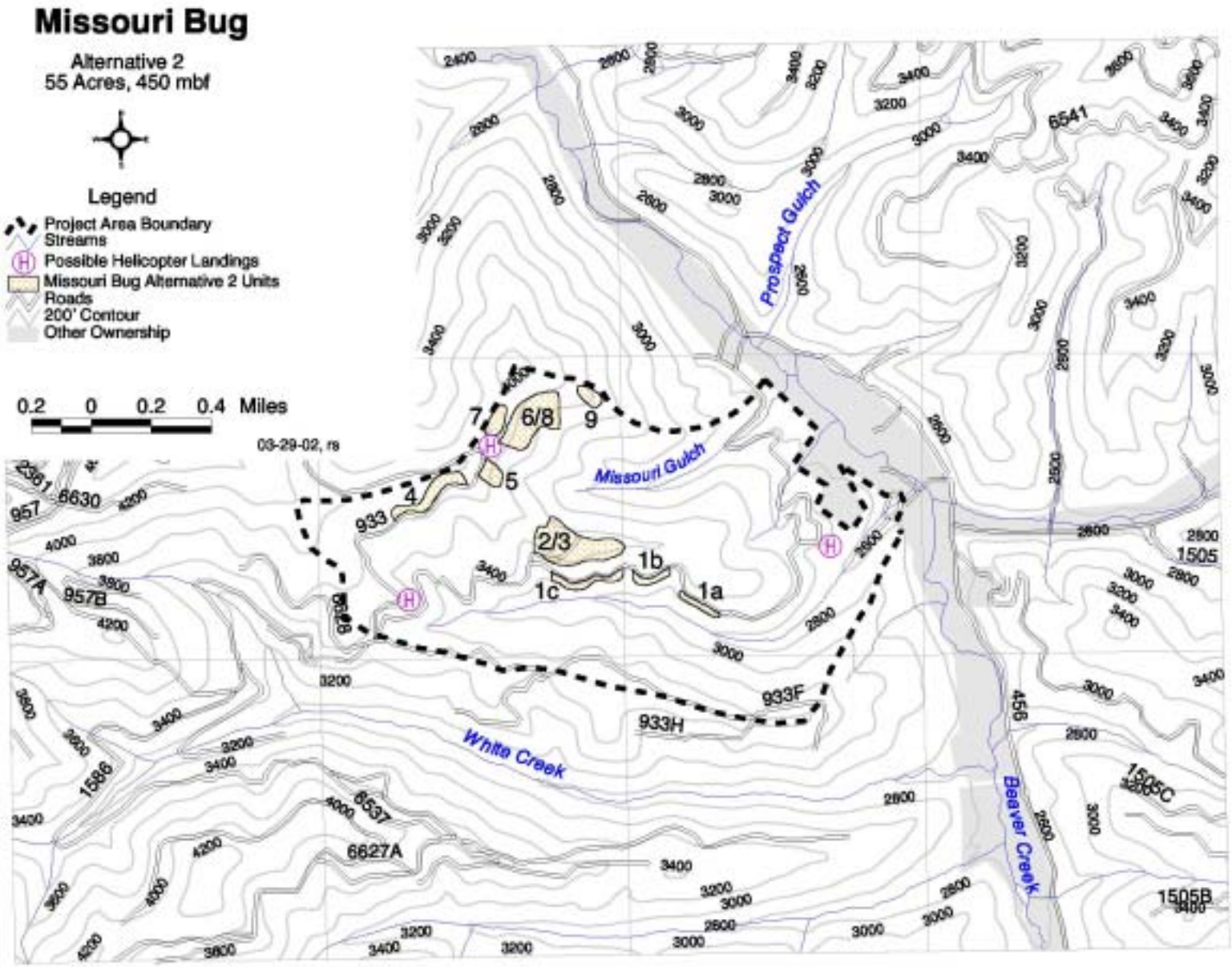
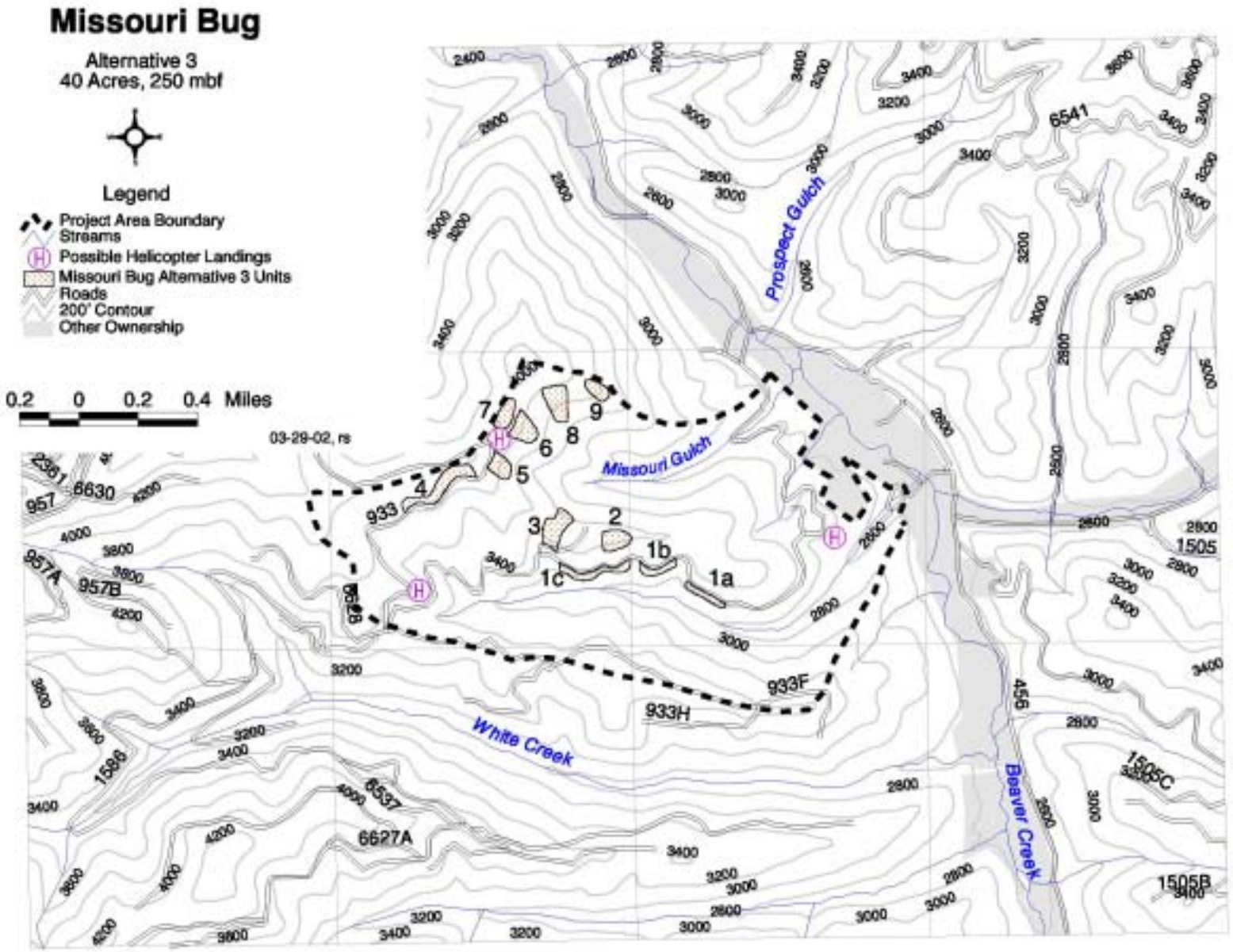


Figure 2-2. Alternative 3 Map.



2.6.2. Features Common to All Action Alternatives

A. Features Designed to Protect Aquatic Resources

In development of the action alternatives, standards and guidelines of the Inland Native Fish Strategy were used specifically to protect water and aquatic biota within the Resource Area. Riparian Habitat Conservation Areas (RHCAs), known locations of sensitive plants and special wildlife habitat areas were excluded from proposed timber harvest or fuel treatment activities. Standard widths for defining interim Riparian Habitat Conservation Areas (RHCA's) were utilized with no modifications. Riparian Management Objectives and road management standards and guidelines were applied within the Resource Area boundary on those roads used for harvesting or hauling of timber. Streamside buffers would be applied along all harvest units in all action alternatives. The intent of the buffers are to meet the riparian management objectives of maintaining slope stability in potentially sensitive areas, maintain stream temperatures and provide a long-term supply of large woody debris. Under the Inland Native Fish Strategy the stream channel buffer widths are as follows:

Category 1 - Fish-bearing Streams: Interim RHCA's consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

Category 2 - Permanently flowing non-fish bearing streams: Interim RHCA's consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Category 3 – Ponds, lakes, reservoirs, and wetlands greater than 1 acre: Interim RHCA's consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs of from the edge of the wetland, pond or lake, whichever is greatest.

Category 4 - Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas: This category includes features with high variability in size and site-specific characteristics.

There are 3 proposed units (1a, 1b, 1c) near Scott Gulch that would maintain a 300-foot buffer between the drainage and the salvage units. There is 1 proposed unit (unit 3) with an intermittent stream on the west side of the unit. A 75-foot no harvest buffer will be maintained along this channel. There is no instream work proposed with this project, therefore timing restrictions will not be necessary.

To minimize erosion and ensure compliance with State water quality standards, all road use and timber harvest associated with the Missouri Heli Bug project would be completed using Best Management Practices. 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. Soil and water conservation practices, identified in the Soil and Water Conservation Handbook, are standard provisions to timber sale contracts (USFS Timber Sale Contract - Division B, 2400-6). Activities would meet or exceed rules and regulations of the Idaho Forest Practices Act, Best Management Practices, and the Idaho Forestry Act and Fire Hazard Reduction Laws (1988).

B. Features Related to Vegetation Management

All proposed harvest units are on sites determined to be suitable for timber production. Within 5 years of regeneration treatment, site preparation for regeneration, fuel treatment and planting would occur. In approximately 10 to 30 years the stands proposed for regeneration (the irregular and group shelterwood harvest units) may be entered for pre-commercial thinning, pruning, cleaning and possibly fertilization to meet target stand and management area guidelines. Precommercial thinning and pruning has been shown to decrease mortality due to white pine blister rust in resistant and non-resistant stock (Schwant, Marsden, McDonald, 1994) and are important tools in managing for this species. Proximity access for stand-tending purposes will be easy to maintain, as these areas are located along main arterial travel routes.

All previously unsurveyed areas identified as highly suitable habitat were surveyed in August of 2001. No proposed threatened or sensitive plants were found. No highly suitable dry guilds for sensitive plant species exist within the project area. No harvest activity would occur which would adversely impact any known threatened, proposed threatened or sensitive plant population. All populations potentially adversely affected would be buffered from harvest activity by a minimum of 100 feet. No harvest activity would occur in riparian habitat. Evaluation of habitat for water howellia (an aquatic species) and Ute ladies'-tresses (a deciduous riparian species), indicates that there is no suitable habitat in the project area.

C. Features Designed to Protect Air Quality

The Idaho Panhandle National Forests are party to the North Idaho Smoke Management Memorandum of Agreement, which established procedures regulating the amount of smoke produced from prescribed fire. The North Idaho group currently uses the services and procedures of the Montana State Airshed Group. The procedures used by the Montana Group are considered to be the "best available control technology" by the Montana Air Quality Bureau for major open burning in Montana. A Missoula-based monitoring unit is responsible for coordinating prescribed burning in North Idaho during the months of April through November. This unit monitors meteorological data, air quality data, and planned prescribed burning and decides daily on whether or not restrictions on burning are necessary the following day.

In practice, a list of all prescribed burning planned for the burning season on the Coeur d'Alene River Ranger District is forwarded to the monitoring unit through the Idaho Panhandle National Forest fire desk before March 1. Daily, by 8:30 a.m., the Coeur d'Alene River Ranger District informs the fire desk of all burning planned for the next day and the fire desk forwards this information to the monitoring unit. By 3:00 p.m. the same day the monitoring unit informs the Forest if any restrictions are to be in effect the following day, and the fire desk informs the District. These procedures limit smoke accumulations to legal, acceptable limits.

Historically, prescribed burning on the Coeur d'Alene River Ranger District occurs in the spring and fall seasons over a total time span of 45 to 60 days during each season. All burning complies with federal, state and local regulations. Management practices include, but are not limited to, burning under spring-like conditions (high moisture content in fuels, soil and duff) to reduce emissions, provide for retention of large woody debris, and to protect the soil. Prescribed burning during spring or fall will generate less smoke than a much hotter stand replacing summertime wildfire.

D. Features Designed to Protect Soil Productivity

No road construction or reconstruction would occur with this proposal. A small amount of compaction would occur with 3 acres of tractor skidding associated with a ridgetop unit. Skid trails would be designed to be 140 feet apart except where converging, to minimize ground disturbance. There are no proposed units where existing soil conditions would not meet Forest Plant soil quality standards before or after harvest. Minor soil disturbances would occur within cable units and where hand fire line is constructed around units.

None of the harvest units are located on geologic formations known to be lacking in potassium feldspar. Areas proposed for underburning treatment would have limbs and tops required to be left in the woods prior to yarding. The slash would remain on site over winter prior to burning to allow nutrients to leach from the material. Burning would occur when soil moistures would be higher than summer months, protecting soil horizons. Using recommendations of the Intermountain Forest Tree Nutrition Cooperative will maximize partible potassium on the sites.

E. Features Designed to Protect Wildlife Habitat

Patches of beetle-killed timber have been excluded from harvest consideration within and adjacent to the project area. Live leave trees in regeneration and rehabilitation areas would be reserved from harvest to provide size class diversity and long-term snag recruitment. Snags would be retained in accordance with the Northern Region Snag Management Protocol (USDA Forest Service, 2000). The Northern Region Snag Protocol calls for greater snag retention than identified under Forest Plan standards. In proposed harvest units that currently contain quality snag densities, 2 to 4 of the largest dead trees per acre would be maintained. Some smaller unmerchantable dead trees would also be retained to achieve the 6 to 12 snags per acre identified for these habitat types under the Snag Protocol Guidelines. There is also expected to be some recruitment of snags during underburning.

Several birds of prey are identified for special protection measures on the IPNF. No nest sites have yet been found in or adjacent to the proposed harvest units. If active goshawk nest sites were found, the nest site would be protected with a 30-acre no-harvest buffer. If active flammulated owl nest sites are found, the Forest Service may cancel timber harvest and yarding activities within 200 feet of the nest site. No tree felling, yarding or other potentially disturbing activities would occur within approximately one-quarter mile of the nest site from March 15 to August 15. These protective measures are based on Management Recommendations for the Northern Goshawk in the Southwestern United States (1992) and would be incorporated into timber sale packages using the appropriate timber sale contract clauses. Any trees that are bole-scorched during site preparation burning operations would be retained on site for black-backed woodpecker habitat.

In all harvest units it will be necessary to retain some down logs in order to protect long-term site productivity, maintain soil organic matter, and provide wildlife habitat. On moist sites, 15 to 20 logs or down trees would be retained on the site. On dry sites, 3 to 6 logs or down trees would be retained. These logs would be at least 12 inches in diameter and 6 feet long. Graham et al recommend minimum levels of woody debris to sustain soil productivity and faunal use of this forest floor substrate. The Northern Region Snag Management Protocol discussed earlier provides snag retention recommendations to assure that the functions of these important components are effectively protected.

Approximately one mile of Road 933 would be opened for sale activities, with a gate in place that and would be closed at the end of each day's activities.

F. Features Designed to Protect Recreational Uses

Contract provisions would be included to protect public safety as previously mentioned. In addition, log hauling would be prohibited on forest roads on weekends and holidays. To avoid impacts to winter recreational use, logging operations would be prohibited on the gated portion of Road 933 (accessing Units 4 through 9) during the period December 1 through March 31. This route is a designated groomed trail within the Browns Ridge snowmobile system.

G. Heritage Resources

Surveys in this area were completed under the Capitol Hill Resource Area Assessment. All known heritage resource sites would be protected under any alternative, as directed by the Cultural Resources Management Practices (Forest Plan, Appendix FF). Any future discovery of heritage resource sites or caves would be inventoried and protected if found to be of cultural significance. A decision would be made to avoid, protect, or mitigate effects to these sites in accordance with the National Historic Preservation Act of 1966.

H. Mitigation

Areas of high potential habitat were surveyed in August 2001. No threatened, endangered, or sensitive plants were found. The timber sale contract would include a provision that allows for modification of the contract if protection measures prove inadequate, if new areas of plants are discovered, or if new species are added to the list. If TES plants would happen to be discovered prior to or during implementation, all newly identified occurrences would be evaluated, and one or more of the following protective measures would be implemented: 1) drop units from activity; 2) modify the unit or activity; 3) implement a minimum 100 feet (slope distance) buffer around sensitive plant occurrences as needed to minimize effects and maintain population viability; and/or 4) implement timber sale contract provisions for "Protection of Endangered Species" and "Settlement for Environmental Cancellation." Effectiveness of these measures are estimated by the District botanist to be "high," because surveys are conducted by trained botany personnel and any discovered habitat or populations are protected by physical buffers where ground-disturbing activities are not allowed.

I. Monitoring

This analysis incorporates monitoring of the Inland Native Fish Strategy (USDA Forest Service, 1995), Best Management Practices, and other Forest Plan Standards described here and in Chapter 3. Monitoring will occur to ensure we've implemented activities as we said we would (implementation monitoring), that the activities are having the level of effects that we predicted (effectiveness monitoring), and that the long-term effects are as anticipated (trend monitoring).

Forest Plan Monitoring

The Forest Plan documents a system to monitor and evaluate Forest activities. Monitoring and evaluation each have distinctly different purposes and scope. In general, monitoring is designed to gather the data necessary for project evaluation. During evaluation of project effectiveness, data provided through the monitoring effort are analyzed and interpreted. This process will provide periodic data necessary to determine if implementation is within the bounds of the project design (Forest Plan, page IV-7). For activities related to the Missouri Heli Bug project, all alternatives would comply with specific monitoring requirements identified by the Forest Plan (Forest Plan, Chapter IV).

Forest Corporate Monitoring

The Idaho Panhandle National Forests have implemented a process to monitor changes to a number of ecosystem conditions resulting from both project activities and natural disturbances. The overall focus of this monitoring is to evaluate changes in ecosystem condition (structure, composition and function). The monitoring is tied closely to findings of the Interior Columbia Basin and Geographic Assessment. The ecosystem conditions that will be tracked for long-term monitoring are identified in the following table.

Table 2-16. Long-term monitoring of ecosystem core data.

Ecosystem condition core data monitoring element	Core data to be monitored
Hydrologic integrity	Road density
Wildlife security and public access	Open road density
Water yield	Hydrologic openings (equivalent clearcut acres)
Changes in forest structure outside the historic range of variability	Forest structure by size and age-class groups
Changes in species composition outside the historic range of variability	Forest composition by forest cover type group
Habitat loss and species decline	TES dry and moist/cold site habitat restoration
Changes in landscape pattern	Landscape pattern indicators (mean patch size and variability, edge density, etc.)

Anticipated changes to these ecosystem conditions under the Selected Alternative will be described in the Decision Notice for this project.

Monitoring Specific to This Project

In addition to the above, the following monitoring activities would occur specific to this project:

Vegetation: All regeneration units would be monitored for regeneration success. All regeneration would be complete in 5 years to meet the NFMA requirements. All intermediate treatments would be monitored to assess achievement of prescription objectives.

J. Schedule of Activities

If either of the action alternatives were selected for implementation, timber harvest would likely occur in 2002, prescribed burning in 2003, and tree planting in 2004. The season of work and acres treated would depend upon the alternative selected, availability of funding, and operating schedule. Please refer to Chapter III, Finances, for a discussion of the types of funding.

2.7. COMPARISON OF ALTERNATIVES

The following briefly compares the effects of each alternative as they relate to the project objectives and issues. It is important that the data in the tables be used as a simple comparison, and not taken out of context. The decision to implement one alternative over another will mean weighing the trade-offs of benefits and effects. A detailed discussion of environmental consequences is provided in Chapter III, by resource.

2.7.1. Forest Vegetation

The following figures display the percent of stands in each structural stage and cover type class, as currently existing and as would occur under each alternative. There are no ponderosa pine, lodgepole pine, Mountain hemlock/subalpine fir, cottonwood, or non-forest cover types within the project area.

The figures demonstrate that even if no action is taken, many of the stands proposed for treatment are moving toward the seedling/sapling category (because of losses to bark beetles and continuing losses to root disease), and would regenerate back to the same cover type of Douglas-fir. The treatment proposed under Alternative 2 would provide for the largest increase in pine and larch stands within the project area. Though small in scope, this would move the area toward goals discussed in the Interior Columbia Basin Ecosystem Management Assessment and the Forest Plan, for a more historic level of species composition. Under Alternative 3, group selection units would change the cover types within treatment units, but would treat fewer acres than Alternative 2.

Figure 2-3. Percent of Cover Types in the Project Area.

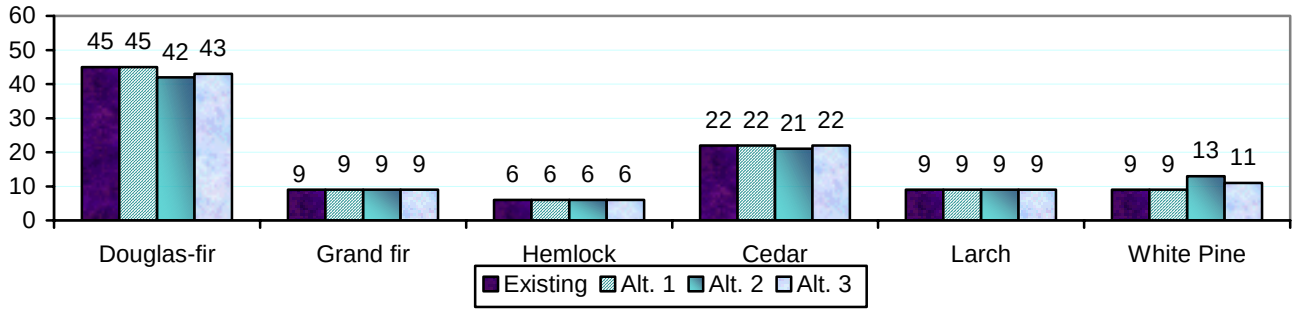
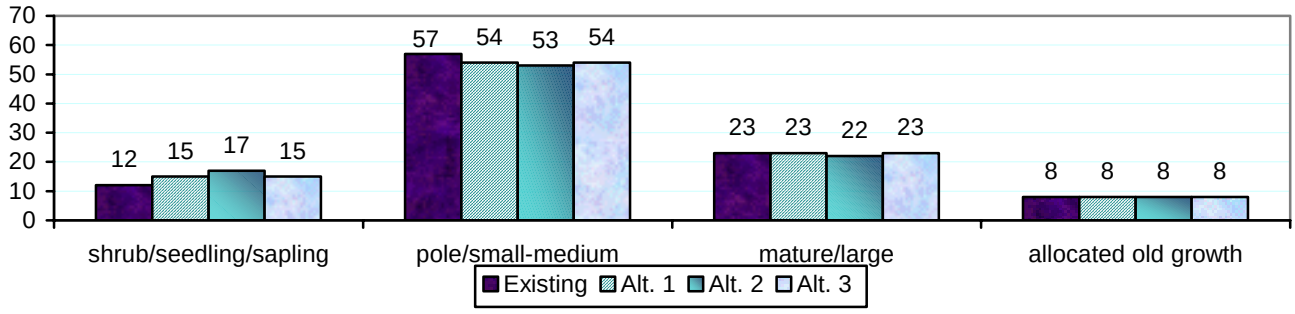


Figure 2-4. Percent of Structural Stages in the Project Area.



Allocated old growth within the Scott Gulch area (approximately 75 acres) would not be harvested under any alternative and would maintain high quality snag habitat within the project area. There is beetle-caused tree mortality throughout this stand.

2.7.2. Fire/Fuels

Under the No-Action Alternative, the current trend of increased fine fuels (such as grasses and shrubs), new understory trees serving as ladder fuels, and continuing accumulation of heavy fuels from down logs and snags would continue, since there are no fuels reduction activities or changes in forest species to interrupt this trend.

Under both action alternatives, harvest of fir and hemlock, underburning in harvest units, and replanting with white pine and western larch would begin a trend toward reduced potential wildfire intensity and severity (please refer to Table 2-13 for the acres of activity under each alternative). Alternative 2 would best meet Forest Plan goals, objectives, and standards for fuels management, based on the amount and type of fuels treatment and silvicultural prescriptions. Alternative 3 would also reduce the long-term fuel loadings with the salvage of dead timber and group selection treatments, but would treat fewer acres. The underburning treatments proposed in Alternatives 2 and 3 would substantially reduce the short-term ground fuels while preparing the sites for planting. Both alternatives would promote long-term seral species to the area, though fewer acres would be restored under Alternative 3. Both alternatives 2 and 3 would maintain healthy western white pine as a natural seed source, along with the reintroduction of planted western white pine, western larch and ponderosa pine. Both action alternatives would move the long-range goals of restoring stand densities and species compositions that would be more fire-resilient than currently exists.

2.7.3. Finances

Both action alternatives would finance all of the proposed treatments. Alternative 3 would provide the greatest net economic return after all costs are subtracted. Alternative 2 would provide for the greatest investment return in re-establishing pine and larch species back into the ecosystem meeting direction in the Forest Plan and Interior Columbia Basin Ecosystem Management Assessment. Both action alternatives would generate a negative net value when looking at the project as a whole. This is primarily due to planning costs. Planning costs, for a small project such as this, are higher than they used to be because of the current level of analysis needed. This project must be analyzed in an environmental assessment where as in the past it would have been categorically excluded from documentation in an environmental assessment. However, since the timber sale generated by each alternative would not be required to carry the full cost of planting (Forest Service Handbook 2409.22, R1 Amendment 2409.22-97-2), the timber sales would actually have a positive net value even though the project as a whole is negative.

Alternative 1 would not generate any revenues from the sale of timber to finance fuels reduction and vegetative restoration needs in this area. The net value of alternative 1 would be negative due to planning costs associated with considering this project. Although small in scope, either action alternative would contribute to the continuing operation of local mills, directly and indirectly enhancing the local and state economy through employment and tax revenues.

Table 2-17. Comparison of net value, by alternative.

Feature	Alt. 1	Alt. 2	Alt. 3
Net value	-$20,000	-$14,828	-$7,737
Net value without planning costs	0	$5,172	$12,263

2.7.4. Watershed/Fisheries

At the tributary scale, no direct or indirect effects to beneficial uses are anticipated under either of the action alternatives. There would be no expected increase in sediment associated with stand treatment activities. The only potential sediment generation would be associated with road maintenance, which is a practice that would normally occur even under the no action alternative. The implementation of Best Management Practices and adherence with the Inland Native Fish Strategy standards and guidelines would provide protection for riparian habitat and control any sediment associated with planned stand treatment activities.

The cumulative effects from implementation of either of the action alternatives would not be measurable at the tributary or watershed scale for increases in peak flows or sediment over what would occur under the No-Action Alternative. The majority of increases in flow would associated with mortality of trees from the Douglas-fir beetle and root disease. Additional harvest to create conditions to allow site preparation and reforestation of low stocking sites (Alternative 2, irregular shelterwood and Alternative 3, group shelterwood) would not result in a measurable increase in magnitude or quantity of flows at the tributary or watershed scale. Alternative 2 would result in a 0.08% increase in equivalent clearcut areas (ECA's) for the Beaver Creek watershed. Alternative 3 would result in a 0.05% increase. This ECA increase is scattered over numerous areas and does not present an increased peak flow risk associated with rain on snow events. No measurable effects would occur in stream channel conditions. Cumulative benefits due to watershed improvements and the reduction of sediment risk from ongoing and reasonably foreseeable activities not associated with this project may be noticeable at the tributary scale and enhance stream conditions and water quality in some localized reaches.

There would be no change in fish population condition at the scale of a stream segment as a result of either action alternative. Because the actions have minimal effects at the scale of a stream reach, this project would have no incremental effect at the scale of the watershed. Although there would be no cumulative effects from this project

at the watershed scale, the overall effects of this project in combination with the past, present and reasonably foreseeable actions would be to maintain the rate at which the Management Indicator Species recover within the analysis area.

2.7.5. Wildlife

Black-backed woodpecker: There may be impacts to individual black-backed woodpeckers because harvest activities will reduce some of the habitat available for potential population increase that may occur due to the bark beetle infestation. However, under all alternatives, there would be an increase in habitat compared to if the beetle outbreak had never occurred. The site preparation burning under Alternatives 2 and 3 (36 and 21 acres respectively) may provide some fire-scorched trees after treatment, which may create preferred feeding habitat for black-backs. Over the long term, the regeneration of treatment areas to pines and larch habitats would provide more habitat that is preferred for feeding and nesting than is currently available in the project area.

Fisher: Currently there is no suitable fisher habitat and 339 acres of capable fisher habitat within the project area. Approximately 40 acres of capable fisher habitat have concentrated beetle mortality which would open up the stand canopies, setting back the period of time before these areas would achieve suitable habitat. Most of the beetle mortality is scattered and not concentrated in patches that would significantly impact habitat in potential fisher areas. Adjacent to some of these beetle mortality areas are root disease openings. These factors combine to make even larger areas that will require extended period of time before they become suitable habitat.

Under Alternative 2, 42 acres of modeled fisher capable habitat would be within treatment areas. There is currently no suitable fisher habitat in the project area. Six of the acres in capable habitat are located within salvage units. Even after treatments, the overstory canopy component will remain dense enough to not set back timeframes for these areas becoming suitable habitat. However, the salvage will reduce some of the future down wood component, which is important aspect of fisher habitat. Thirty-six treatment acres will have canopies reduced below 50% overstory canopy component setting back the timeframe before these areas will become suitable. Approximately 21 of these 36 acres had the canopies reduced below 50% by beetle mortality. Fifteen of these 36 acres will have canopies reduced as a result of the harvest treatment. However, the proposed irregular shelterwood harvests is expected to provide some small areas of dense-canopied denning habitat scattered throughout the treatment areas. This may allow these areas to be usable by fisher sooner than more conventional regeneration harvest treatments. Future down wood component will be reduced with the proposed regeneration treatments, which would negatively affect quality fisher habitat.

Under Alternative 3, beetle mortality would naturally open canopies. Delays in capable habitat becoming suitable habitat would only be as a result of beetle mortality. No delay would be the result of the harvest treatment itself. Loss of some of the future down would component would again occur with this alternative but over less acres.

Goshawk: There would be no loss of suitable or capable habitat as a result of any alternative. No harvest would occur within capable or suitable habitat under any alternative.

Elk: The Forest Plan goal for elk habitat potential in this EHU is 55 percent; the current level is 49 percent. Under Alternative 1, there may be some loss of thermal cover due to the Douglas-fir beetle outbreak, and some areas where increases in canopy openings would provide forage over time rather than cover. This would have a minor effect on elk, and would not be measurable enough to cause the elk habitat potential to change. There would be no loss of security beyond the existing condition. Under both action alternatives there would be some loss in hiding and thermal cover beyond what the Douglas-fir beetle has done, however cover is not limiting in this area. There would be no new road construction or reconstruction with either alternative. There would be a short-term loss in security with activities behind an existing gate. This gate would be closed at the end of daily activities to minimize the disturbance. No key winter or summer range exists within the project area. Elk habitat potential would remain at 49 % before, during, and after sale activities under either action alternative. Cumulatively, there would be no change from the existing elk habitat potential.

CHAPTER 3
EXISTING CONDITIONS, ENVIRONMENTAL CONSEQUENCES

3.1. FOREST VEGETATION

3.1.1. Regulatory Framework

Federal legislation, regulations, policy and direction that require protection of species and population viability, evaluation and planning process consideration of threatened, endangered and other rare (Forest Service "sensitive") plant species include the Endangered Species Act (1973) as amended; the National Forest Management Act (1976); the National Environmental Policy Act (1969); Forest Service manual (2672.1-2672.43); Idaho Panhandle National Forests, Forest Plan (1987); and direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants program and Washington Office.

Regulatory constraints applying to the management of timber resources include the Forest Practices Act, Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), National Forest Management Act of 1976 (NFMA), and Forest Service policy.

RPA states, "It is the policy of Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans."

Plans will be developed which specify guidelines to identify the suitability of lands for resource management; provide for the diversity of plant and animal communities based on the suitability and capability of land areas to meet multiple-use objectives; where appropriate, to the degree practicable, preserve the diversity of tree species similar to that existing in the planning area; insure that timber will be harvested from National Forest System Lands only where soil, slope, or other watershed conditions will not be irreversibly damaged; the lands can be adequately restocked within five years after harvest; protection is provided for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water where harvests are likely to seriously and adversely affect water conditions and fish habitat; and the harvesting system used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber.

Any cut designed to regenerate an even-aged stand of timber must be determined to be appropriate to meet the objectives and requirements of the land management plan and, in the case of clearcutting, is the optimum method; has had an interdisciplinary review of impacts and the cuts are consistent with the multiple use of the general area; will be shaped and blended, to the extent practicable, with the natural terrain; meets established, suitable size limits; and is carried out in a manner consistent with protection of soil, watershed, fish, wildlife, recreation, esthetic resources, and the regeneration of the timber resource.

NFMA amended RPA and requires that stands of trees shall generally have reached the culmination of mean annual increment of growth prior to harvest; this does not preclude the use of sound silvicultural systems such as thinning and other stand improvement measures and also allows salvage or sanitation harvest following fire, wind throw, or other catastrophe or within stands in imminent danger of insect and disease attack.

Forest Service policy directs land managers to:

1) Use only those silvicultural practices that are best suited to the land management objectives for the area. Consider all resources, as directed in the appropriate forest plan.

2) Prescribe treatments that are practical in terms of cost of preparation, administration, transportation systems, and logging methods.

3) Monitor practices using procedures specified in forest plans to ensure objectives are met.

4) Before scheduling stands for regeneration harvest, ensure, based on literature, research, or local experience, that stands to be managed for timber production can be adequately restocked within 5 years of final harvest. Five years after final harvest means five years after clearcutting, final overstory removal in shelterwood cutting, the seed tree removal cut in seed tree cutting or after selection cutting.

5) Perform all silvicultural activities in the most cost-effective manner consistent with resource management objectives.

Forest Service policy further directs that:

6) The size of tree openings created by even-aged silvicultural methods will normally be 40 acres or less. With some exceptions, creation of larger openings will require 60-day public review and Regional Forester approval.

7) For management purposes, cut areas created by even-aged management will no longer be considered openings when both vegetation and watershed conditions meet management objectives established for the management area.

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

Protection of timber stands from insect and disease problems will center on the silvicultural treatments prescribed for timber management activities.

Proposed activities will be consistent with Management Area objectives. Descriptions and objectives of these Management Areas are included in the Forest Plan.

3.1.2. Affected Environment

A. Introduction

The vegetation in northern Idaho is a result of the prevailing climatic pattern in which westerly winds carry maritime air masses from the northern Pacific across the northern Rocky Mountains during winter and spring. This weather pattern is characterized by precipitation occurring mainly between November and February, with only 12 percent of the annual precipitation occurring between July and September (Geographic Assessment, page 12). The inland maritime airflow provides northern Idaho with abundant moisture and moderate temperatures.

The subbasins of northern Idaho contain diversity of habitats and plant communities, many of which contain plant species that are known or thought to be rare. Of the estimated 1,200 to 1,500 plant species known or

thought to occur here, about 10 percent are considered rare or uncommon. There are no federally listed endangered plants for the IPNF. Two species are listed as threatened for the IPNF. There are no documented occurrences of these species although suitable habitat is thought to occur. There is a third species of plant that is being considered for listing as threatened for the forest. This too has no documented occurrences although suitable habitat is thought to occur on the IPNF. Thirty-one species of sensitive plants are known or suspected to occur within the subbasin. For additional information, please refer to Appendix A and the Project Files (Vegetation).

B. Habitat Types

The vegetation in the Coeur d'Alene subbasin reflects the climatic conditions discussed above. "Habitat typing" is a land classification system based on the potential climax natural vegetation that could occupy a site. Habitat types are named for the potential climax community type or plant association, which is denoted by the climax tree species (usually the most shade tolerant tree adapted to the site), and the dominant or indicator undergrowth species of the plant association (Cooper et al. 1991). The climax tree species denoted in a habitat type is not necessarily dominant or even present on the site. A very high percentage of forested landscapes reflect some degree of disturbance resulting in a preponderance of seral stages. Forest Habitat Types of Northern Idaho: a Second Approximation (Cooper et al. 1991) was the basis for determining habitat types in the Coeur d'Alene sub basin.

Within the project area, the most common habitat types are western hemlock/queencup beadlily and grand fir/queencup beadlily. The lowest elevations and stream bottoms represent western hemlock/ oakfern, western hemlock/ginger and a portion of cedar types.

Threatened and sensitive plants and Forest species of concern can be assigned to one or more rare plant guilds. These guilds are artificial assemblages based on similar habitat requirements used for the purpose of analysis. For the Idaho Panhandle National Forests, the rare plant guilds are aquatic, deciduous riparian, peatlands, cold forest, wet forest, moist forest, dry forest and subalpine. Rock seeps and springs are another habitat that can support certain sensitive plants, however these can occur across all guilds and are not identifiable at a coarse scale (please refer to the Project Files – TES Plants for specific plant guild descriptions).

C. Coeur d'Alene River Basin Geographic Assessment

Findings of the Geographic Assessment, at least in relation to vegetation disturbance, are very similar to more broad-scale conclusions found at the Columbia Basin and Northern Region scales:

1. *Disturbance and successional regimes have been altered since the Euro-settlement in North Idaho.*

2. *There has been a substantial reduction in the percent of the landscape composed of early seral species such as western white pine, ponderosa pine, and larch. This is primarily the result of fire suppression, timber harvest and the introduction of white pine blister rust.*

3. *There has been a major reduction in old growth forest structure while intermediate aged forest has increased dramatically. This is primarily the result of timber harvest focusing in older trees, fire suppression and the introduction of white pine blister rust.*

4. *Landscape patterns have been modified by timber harvest and exclusion of fire. Current landscape patterns are more uniform. Old growth patches are smaller in size. Approximately the same percentage of the landscape is in openings but the openings are more numerous, smaller in size, and scattered across the watersheds.*

The purpose of the Geographic Assessment was to develop a scientifically based understanding of the processes and interactions occurring in the project area, so that activities can be developed to promote healthy ecosystems. In order to maintain healthy, sustainable ecosystems, it is important that species are well adapted to the environmental variability inherent in the ecosystem and to maintain forest structures necessary to support ecosystem diversity and productivity. This is consistent with the Columbia Basin Assessment (ICBEMP) and the Northern Region Overview. The Geographic Assessment suggests converting shade-tolerant/drought- and fire-intolerant species to shade-intolerant/drought- and fire-tolerant species. The project interdisciplinary team considered these recommendations as they developed the proposed alternatives.

D. Habitat Type Groups

Although every habitat type is unique in some way, they can be grouped based on similarities in natural disturbance regimes, successional patterns and structural characteristics of mature stands (USDA Forest Service, Region One, 1997).

All of the habitat types within the project area are in the Moderately Warm and Moderately Cool Moist Habitat Type Group. There are several stands that did not have habitat type data available, however, based on location, they are likely to fall within this same group.

The habitat types of this group within the Missouri Heli Bug project area consist primarily of western hemlock/queencup beadlily and grand fir queencup beadlily. The current forest cover types are dominated by Douglas-fir, cedar, western white pine and grand fir. Western hemlock and grand fir are the major species on the north facing slopes. Prior to the introduction of blister rust, over 50 percent of these areas were dominated by white pine, the area was known as the "white pine type". Currently, 9 percent of the Missouri Bug project area is classified as western white pine forest cover type. Historically, these habitat types had fire-free intervals of 40 to 130 years or more (Zack and Morgan 1994). Stand replacement fires, while infrequent, could be severe during times of drought. Sensitive plants of the moist forest guilds are most likely to be located within this habitat type group.

E. Disturbance and Successional Patterns

Fire: Historically, the major disturbances within the project area would have been large stand replacing fires that occurred at intervals of 200 or more years (Geographic Assessment, page 29). Low and mixed severity fires were common but would seldom remove canopies and regenerate stands. This disturbance pattern would have created large patch sizes that would often develop into mature or old growth forests. Following disturbance, these stands would have gone through grass/forbs and shrubs stages prior to the sites being dominated by trees. The tree species that dominate the site following disturbance would have been dependent on the species present prior to the fire, the fires intensity and its extent. Assuming early seral species were present prior to the fire; species such as lodgepole pine, larch, white pine and Douglas-fir would dominate most sites initially. As crown closure became complete, regeneration of shade intolerant species would cease. Shade tolerant grand fir, hemlock, western red cedar and Douglas-fir (on the drier sites) would be present and survive as understory vegetation for long periods of time. In the absence of further disturbance the short-lived lodgepole pine would begin to decline and the long lived seral species such as white pine and western larch would dominate the stands. As the long-lived serals age and decline in vigor, they would become susceptible to insects and diseases.

Mountain pine beetles played a major role in killing individual trees and groups of white pine (Geographic Assessment, page 29). Holes created in the canopy by the death of these overstory trees would likely be filled by the shade tolerant understory species. In the absence of further disturbance, climax forests of shade tolerant overstory and understory trees might be attained although remnant, large seral species might remain a component for many years.

Low and mixed severity fires that occurred between the major stand replacement events would help to perpetuate the long lived seral species by removing competing, shade tolerant species from the understory. Where these mixed severity fires did create small or moderate sized openings in the canopy; early seral species were likely to regenerate. These types of fires have been largely eliminated by aggressive fire suppression efforts instituted in the last 60 years.

Logging: The Missouri Bug project area has not had a stand replacement fire since 1889. Homesteading within Beaver Creek was likely a major contributor of early removal, along with products removed for mining. Early harvests in the 1880s and 1890s removed lumber products easily accessible mainly within riparian areas, these areas have recovered to maintain stand densities within these areas. More intensive management began in the late 1980s with clearcutting, seed tree, and shelterwood harvests tending to fragment the landscape into smaller patch sizes. Salvage of diseased timber also has taken place between the other harvests. These harvests took place within Scott Creek but have not occurred within the Missouri Gulch drainage. Most areas regenerated since the late 1980s and early 1990s have been planted with white pine, western larch and/or ponderosa pine. Prior to the mid 1970s very little white pine was planted since blister rust was likely to kill the seedlings and disease resistant stock was not available. Douglas-fir was the preferred species since seed sources were readily available and the species grew well, although larch was also planted to some extent. The problems associated with root diseases that develop in these stands as they mature were not recognized at the time.

Root Disease: Historically, root diseases were significant factors in reducing the competition from Douglas-fir and grand fir to maintain western white pine, western larch and, on some sites, ponderosa pine. Douglas-fir tended to regenerate readily in the early stages of stand development, but dropped out as a significant component due to high rates of root disease caused mortality (Byler and Zimmer-Gorve 1990). Western white pine, ponderosa pine and larch have a high level of resistance and were able to capitalize on this reduced competition. Fire exclusion and the loss of these species through logging and blister rust have reduced the opportunity for early seral species to become established in root disease areas. Root disease and white pine blister rust are currently the most prominent landscape-altering process within the project area and the entire Coeur d'Alene River basin (Geographic Assessment, page 30).

Douglas-fir Beetle: Douglas-fir beetles have always been present throughout the Coeur d'Alene subbasin. The presence of root disease in many of the Douglas-fir forest types has resulted in high endemic levels of the Douglas-fir beetle and the propensity for rapid beetle population build ups during favorable conditions (Lockman and Gibson 1998). Douglas-fir beetle outbreaks occur following disturbances such as windfall, snow breakage or fire. In particularly dry years, insect infestations and mortality could increase dramatically. Short-term increases in fuel loading may have led to increased crowning of moderate severity fires and created small to large openings for the reintroduction of seral species. In some cases, these insect infestations may have contributed to large stand replacing fires (Geographic Assessment, page 30).

Loss of White Pine: White pine blister rust was unintentionally introduced into this area in the early 1900s. Eventually, white pine was infected over the entire Coeur d'Alene subbasin; many trees were either killed or there was an accelerated harvest to recover their economic value. The loss of mature white pine and the continuing mortality of younger trees led to the increase in Douglas-fir, grand fir and hemlock.

3.1.3. Existing Condition

A. Current Situation in the Coeur d'Alene River Basin

As stated earlier, the findings of the Geographic Assessment indicate that there has been a tremendous change in both species composition and stand structure within the Beaver Creek drainage and the Missouri Bug project area.

Long-lived seral species (western white pine and western larch) have declined within the Coeur d'Alene River subbasin as a result of white pine blister rust and timber harvesting that tended to remove these species while leaving species such as grand fir, hemlock and Douglas-fir. On the drier sites, aggressive fire suppression has allowed the encroachment of Douglas-fir and grand fir into the understories, creating much denser stands over larger areas and increasing the potential for stand replacing fires.

The early logging to remove white pine, continued salvage efforts, and white pine blister rust have combined to reduce white pine as an important forest cover type in this area. Historically, white pine was probably the dominant cover type on 50% of the Coeur d'Alene River basin. White pine is currently the dominant cover type on less than 10 % of the project area, the majority of this is planted genetic stock, in the regeneration units, though remnant stands still exist within the planning area and throughout Beaver Creek. Blister rust mortality continues through these older stands of natural western white pine.

In terms of forest structure, the greatest changes have been in the amount of old growth and pole/medium sized timber found on the landscape. This was generally the result of the aggressive harvest of white pine and larch and the loss of white pine to blister rust. Stands of grand fir and Douglas-fir that have replaced white pine and larch in the ecosystem are very susceptible to root disease and insect attack. These stands are unlikely to provide the same closed canopy, multi-storied mature and old forest structure containing large white pine and larch that was once a major component of the project area. Although these stands may contain large old trees and provide some old structure characteristics, openings caused by root disease may be common, and a key component of remnant white pine and larch will be missing.

Douglas-fir, grand fir and western hemlock were, historically, the dominant cover types on about 30% of the Coeur d'Alene River basin. The project area currently has 80% of the area in fir and hemlock cover types. This shift in species composition has also created a shift in insect and disease problems. Shade tolerant species such as grand fir, Douglas-fir, and western hemlock are more susceptible to root diseases than early seral species like larch and white pine. The dramatic increase in the shade tolerant species has been accompanied by a dramatic increase in root diseases. These diseases are now the major pathogens within the project area. As stands increase in age, the incidence of root disease is also expected to increase.

The current Douglas-fir beetle outbreak began in Douglas-fir damaged by wind, snow and ice during the winter of 1996-97. Salvage operations removed some of this downed material in the basin, but Douglas-fir beetles were able to develop brood in many down trees and the bark beetle populations increased dramatically. The 1999 insect and disease flight found 63,100 acres of National Forest land within the Coeur d'Alene River Ranger District with some level of Douglas-fir beetle infestation. Some of these areas, approximately 10%, are currently being harvested as part of the Douglas-fir Beetle Project EIS (USDA Forest Service, 1999) or proposed under the Small Sales EIS (USDA Forest Service, 1999). Within the Missouri Heli Bug project area, approximately 200 acres were identified with Douglas-fir beetle mortality. This estimate is based on ground reconnaissance. In most cases the mortality caused by the beetles is relatively light and scattered but in some stands or portions of stands the mortality is heavy. Portions of the mortality are located in allocated old growth and riparian habitat areas and are not identified for harvest activities. Ice and snow damage within the project area was generally light. The presence of the Douglas-fir beetle within the project area is the result of subsequent beetle flights from initial infestation areas within the Beaver Creek drainage.

The Douglas-fir beetle prefers larger diameter, mature trees (Schmitz and Gibson 1996, Flanagan 1998) and the results of sampling completed on the IPNF in 1998 indicated an average diameter of attacked trees of 18.5 inches (Kegley et al. 1999). The effects and extent of this outbreak were exacerbated by hot and dry weather during 1998. Over 85 percent of the trees attacked by the beetles in 1998 are dead or dying (Kegley et al. 1999). For trees attacked by beetles in 1999, this percentage dropped to about 71 percent (Kegley, 2000). This successful attack rate again approximated 71 percent in 2000 (Kegley, 2001). Eventually this success

attack rate is expected to stabilize as beetle populations return to endemic levels, although annual weather conditions could affect this rate.

The Douglas-fir beetle tends to kill trees in groups because they release pheromones that attract other beetles to susceptible trees and cause mass attacks (Flanagan 1998). When trees are successfully attacked, the beetles release anti-aggregate pheromones, repelling incoming beetles that then attack adjacent trees. Due to the epidemic populations we are currently experiencing, these groups of attacked trees are coalescing to create larger openings in the forest canopy. Within the Missouri Bug project area infested trees tend to occur in small groups of less than 20 acres in size.

The Douglas-fir beetle will create "openings" of varying sizes across the landscape. An "opening" is defined as a forest stand, group of stands or portion of a stand where bark beetles, in conjunction with other agents such as root disease and snow or ice damage, kill more than 50 percent of the existing stand overstory. Within the project area these openings range from 4 to 10 acres in size.

The peak year of the beetle epidemic was probably in 1998, but additional mortality occurred in 1999 and 2000. Beetle populations tend to decrease rapidly when down and/or damaged trees are no longer available in large numbers.

B. Current Situation in the Project Area

The information provided below comes from a variety of sources. The extent and location of current bark beetle infestations was based on field reconnaissance during the summer of 2000. Ground reconnaissance is also helping to locate existing openings created by root disease losses. Information for National Forest System lands on habitat types, forest cover types, forest structural stage and past harvest activity is based on existing databases (Timber Stand Management Record System, TSMRS), stand exam information, historical records and aerial photo interpretation. Maps of forest cover types, habitat types and past harvest activity are available in the Project File (Vegetation).

Based on field surveys, there are currently approximately 200 acres that have mortality caused by Douglas-fir beetle within the project area. There may have been some areas where trees attacked in 2000 were not yet showing symptoms and were therefore not detected. Many of these acres have light infestations but some areas have been heavily attacked.

Root disease openings are scattered throughout the area. These openings have been created over time with a gradual loss of overstory canopy. These openings are quite variable. They range in size from ¼ acre to 5 acres. Residual overstory component is also highly variable but these areas are opened enough that shrub/seedling/sapling is now the structural component of the area. Research shows that tree mortality to root disease on average generally runs at about 4 percent per year. This figure is even higher in infected areas (Schwandt, Forest Pathologist, personal communication 2001). As these stands open up, regeneration and brush occupy the site. Most of the regeneration is to climax species, especially Douglas-fir and grand fir since they are the main cover types in the area. Seral species such as pines and larch do not have a chance to become established in these areas as the change is too gradual to create conditions favorable to their regeneration and because their presence as a seed source in the existing overstory is low. Since the climax species that are regenerating these root disease openings are highly susceptible to the root disease, it may lead to a perpetual state of regeneration and brush in these openings.

The structural stage categories listed in the table below are quite broad and are based on stand age. The shrub/seedling/sapling stage includes forest stands that are less than 35 years old. These stands have resulted from past regeneration harvests or natural event such as fire. These stands may consist of seedlings planted within regeneration harvests in the mid 1990s. Some stands may retain a considerable number of overstory trees for shelterwood purposes, while others may have no large tree component.

The pole and small-to-medium timber structural stage consists of stands that are 36 to 100 years old. These stands represent natural regeneration left after selective removal of the large, valuable overstory trees or as a result of the stand replacement fire in the late 1800s. Root disease and blister rust along with smaller fires have also changed the structure within the project area and the Beaver Creek drainage. Many of these stands are quite dense with high stocking levels; but some are rather open, particularly where commercial thinning harvests or mortality from root disease has taken place.

The mature, large timber structural stage includes stands of trees that are over 100 years old. These stands generally resulted from fires prior to 1900 and are quite varied in appearance. Stand conditions may be quite open as a result of past harvest activity, root disease, fire, or soil conditions. Stands unaffected by these events will be dense with fairly closed canopies.

The old forest structure includes stands of trees that are over 150 years old that resulted from fires or other natural disturbance prior to 1851. These areas have often been highly fragmented by past regeneration harvests, and existing stands will vary in composition and canopy closure based on past harvest activity, root disease, fire or soil conditions.

There is very little detailed information on areas harvested prior to the 1950s. Therefore, the tables do not include acres harvested prior to this time. Also, many areas have had more than one harvest entry, particularly commercial thinning and sanitation/salvage harvests. Acreages used are based on mapped acreages that may differ from acreages in the TSMRS database. This is particularly true of sanitation/salvage type harvests where only a portion of a mapped stand may have been treated.

Table 3-1. Vegetative conditions in the Missouri Heli Bug area.

Habitat Type Group	**Approximate Acres**	**% of Forest Lands**
Moderately Warm and Moderately Cool/Moist (Groups 4 and 5)	937	100
Forest Cover Types	**Approximate Acres**	**% of Forest Lands**
Grand fir	85	9
Douglas-fir	427	45
Western hemlock	55	6
White Pine	84	9
Western red cedar	203	22
Western larch	83	9
Structural Stage	**Approximate Acres**	**% of Forest Lands**
Shrubs/Seedlings/Saplings	116	12
Poles/small-medium timber	534	57
Mature/large timber	212	23
Old Forest	0	0
Allocated old growth	75	8
Recruitment old growth	0	0
Past Timber Harvest and Fires	**Approximate Acres**	**% of Forest Lands**
Clearcuts	71	8
Seed Tree & Shelterwood	65	7
Overstory Removal	0	0
Sanitation/Salvage	6	1
Commercial Thinning	0	0
Selection Harvest	0	0
Fires since 1950	0	0

The Missouri Heli Bug project area encompasses approximately 937 acres, all National Forest System lands. About 12% (116 acres) of the project area is less than 20 years old. Generally these stands are the result of the regeneration harvests that have occurred since the early 1990s. Most all these acres are in seedling and sapling size timber. Approximately 57% is 35 to 100 years old. These stands generally range from pole to immature saw timber size classes. Around 23% of the area is in stands that are 100-150 years old. This is considered mature saw timber. There are 75 acres of allocated old growth within the project area.

There are approximately 71 acres of clearcuts, 65 acres of shelterwood harvests, 6 acres of salvage logging, that the database is tracking as having occurred within the project area. Most of these treatments were a result of the Capitol Hill Planning Area (Scott Gulch Timber sale) that occurred in the late 1980s and early 1990. All have been planted with western white pine, western larch. Areas harvested between 1900 and 1940 are likely not to be included in these figures. Harvest associated with that time period was likely associated with individual tree selection.

There have been no fires in recent history that would have altered stand structure, although there have been numerous small lightning fires.

3.1.4. ENVIRONMENTAL CONSEQUENCES

A. Methodology

From a vegetation standpoint, the effects of the Douglas-fir beetle epidemic, root disease, and resulting proposed harvest activities on species composition and stand structure will be used to determine environmental consequences.

Fragmentation analysis using FRAGSTATS modeling was not completed. Bark beetles and root disease created most of the change in stand structure in these areas, not the harvest treatments. FRAGSTATS is also designed for a larger scale analysis and would not be applicable to the scope of this project.

The reasonably foreseeable time frame for the beetle epidemic and activities associated with the action alternatives was assumed to be approximately two to three years.

B. Direct and Indirect Effects

Direct and Indirect Effects Common to All Alternatives

Under all alternatives, the number of acres affected by Douglas-fir beetles and root disease would remain the same. Typically, Douglas-fir beetle outbreaks last 3 to 4 years. Although there may be some additional mortality in 2001, bark beetle populations are expected to drop back to endemic levels within the next few years. The actual severity of future attacks can be greatly influenced by weather and predicting exactly which stands will attract the beetles is difficult since they are strong fliers and can move several miles. Based on aerial detection flights, initial bark beetle attacks in 1998 were usually associated with areas that sustained ice and snow damage in 1996-97. Beetle mortality within the Missouri Bug area is believed to be the result of subsequent beetle flights away from initial infestation areas. Because beetle populations are dropping, no attempt was made to incorporate future beetle infestation that may occur outside currently known locations into any alternative. The extent of bark beetle activity and stand openings as a result of root disease mortality is based on on-the-ground surveys.

Direct and Indirect Effects Common to Both Action Alternatives

Under either action alternative, proposed activities would not reduce the beetle populations. Bark beetles have already flown from most trees proposed for harvest and it is unlikely that trees with current infestations could be harvested before the beetles leave to attack other trees.

At this time, there is no known literature displaying Douglas-fir beetle-infested timber that has been transported to milling facilities, causing further infestation. Although no literature exists, other species of beetles transported in timber to milling sites have been known to serve as a source for spread of beetle activity. In the proposed alternatives, most trees to be removed would be dead Douglas-fir trees from which the beetles have emerged prior to logging activities. This timber would cause no spread of Douglas-fir beetles. A small portion of the trees removed could be infested with beetles and larvae at the time of removal and would be transported to mill sites. Prior to the beetles emergence from the timber, most logs would be processed (i.e. debarked), which would kill the beetle and larvae.

Direct and Indirect Effects Under Alternative (No Action)

There would be no harvest of trees killed by the Douglas-fir beetle or weakened by other pathogens under this alternative. Douglas-fir mortality generally occurred in groups as the pheromones synthesized by the beetles attracted more beetles to the initial location. This led to mass attacks where most of the large Douglas-fir trees were killed. In most cases these groups of dead trees were less than one acre in size but in some cases, all large Douglas-fir were killed over greater areas. Smaller diameter trees sometimes were also attacked when they occur near these groups, especially in denser stands.

Stands affected by the beetle may experience a change in species composition, most often to a climax tree species, and changes in stand structure to a younger age class or a more open canopy. There are expected to be shifts in stand species composition due to mortality caused by bark beetles, but these shifts are not expected to increase the early seral species component. In most stands where over 50 percent of the basal area is killed by Douglas-fir beetles, the dominant overstory species following the beetle infestation is likely to be grand fir. In the absence of further disturbance these stands are likely to regenerate to Douglas-fir and grand fir, so there would be no long-term shift in species composition. Loss of overstory canopy to root disease is also expected to create little change in forest cover types. Since the disturbance is so gradual, regeneration of shade-tolerant species is also expected. The change in forest structure would depend on the amount of beetle mortality and the size of adjacent root disease openings.

Losses of less than 25 percent of the basal area of a stand would not impact stand structure. Because beetles tend to kill trees in groups, it is likely that any holes in the canopy are small and will quickly regenerate with shrubs or shade-tolerant species. Stands in which 26-50 percent of the basal area has died will have a more open appearance once the dead trees fall to the ground. Again, canopy openings are small and will regenerate quickly. In stands where 50-100 percent of the basal area has been killed by bark beetles, the results tend to be more dramatic. Groups of trees killed by the beetles combine, and more of the associated small diameter Douglas-fir may be attacked. The entire stand would have a more open appearance. The understory vegetation becomes more dominant and the stand structure reverts to a shrub/seedling/sapling structural stage. In some areas bark beetle created openings have coalesced with root rot pockets to create larger openings. These larger openings generally retain groups of trees and scattered individual trees that have been unaffected by the bark beetle infestation.

It is estimated that approximately 200 acres of National Forest System lands within the project area has incurred some mortality due to the current bark beetle epidemic. Some of this mortality will have little impact on stand structure. Approximately 50 acres are projected to have a substantial (greater than 50 percent of the stand basal area) loss of forest tree cover due to the beetles in conjunction with existing root disease openings. Natural regeneration of shade-tolerant species is expected to occur in these more heavily impacted areas, but

there would be no change to the desired early seral species composition. As dead trees decay and begin falling to the ground there will be an increase in fuel loading that could effect fire intensity. In some areas mortality is relatively light and there will be little increase in the potential for severe fires. However, where there is moderate to high mortality, the increase in fuel loading as the dead trees fall to the ground and the fuel ladder created by regenerating Douglas-fir and grand fir will increase the risk of stand replacing fires.

Direct and Indirect Effects Under Alternative 2 (Proposed Action)

There are four areas where regeneration harvests would occur ranging from 4 to 18 acres in size for a total of 36 regeneration treatment acres. These openings would retain groups of trees and/or scattered individual trees that have been unaffected by the bark beetle infestation, root disease or white pine blister rust. Much of these areas (21 acres) have already had a change in stand structure class as a result of bark beetle, root disease, and blister rust mortality. Other areas, approximately 15 of the 36 acres, though having less than a full canopy component would be considered to have had the structural stage class changed by the harvest treatment itself. Species composition would be changed on these 36 acres by introducing pines and larch back into these ecosystems instead of allowing them to regeneration naturally back to their current species composition.

This combination of salvage and regeneration treatments may reduce rates of spread, fire intensity, and fire severity on these sites over the short and long term and reduce the potential for stand replacing fires in this area.

Direct and Indirect Effects Under Alternative 3

The objective of this alternative is to harvest only dead and dying trees in areas with mortality caused by Douglas-fir beetles. Fading trees, associated with root disease or other pathogens, would also be salvaged in these beetle mortality areas. However, no effort would be made to expand units to treat root disease and blister rust mortality outside of the beetle-affected areas under this alternative.

There would be three areas where salvage treatment would occur ranging from 1 to 6 acres in size for a total of 19 acres, same as described for alternative 2. This salvage treatment would not change the structural class or the species composition in those areas. Regeneration harvest treatments would occur on 6 units, ranging in size from 4 to 7 acres, for a total of 21 acres. A group shelterwood harvest treatment would be used retaining larger healthy trees as described in alternative 2. Underburning and planting would occur on these 21 regeneration acres. The structural class would have already been changed by the bark beetle mortality on these 21 acres. The species composition would be changed by planting pines and larch back onto these sites.

C. Cumulative Effects

The following tables provide summary information on how each alternative would affect stand structure and species composition within the Missouri Heli Bug project area. The change in stand structure under the No-Action Alternative would be the result of bark beetle and root disease mortality. The action alternatives would have little impact on beetle populations so the effect of the beetles on stand basal areas is expected to be the same for all alternatives. Stand structure would generally be the same as that created by bark beetle and root disease mortality, although Alternative 2 would produce some change as a result of the harvest itself. Changes in species composition from Douglas-fir and grand fir to ponderosa pine, white pine and larch would occur at the time of planting in regeneration harvest stands under Alternatives 2 and 3. These seral species would be expected to be managed throughout the life of the stand and would, therefore, be more likely to provide the desired mature and old forest structure in the future than more root disease-susceptible species such as Douglas-fir and grand fir.

In the following tables, "Existing Condition" incorporates all past activities that have occurred over the landscape, such as timber harvests, planting and fires. Generally, ongoing activities are included in the

existing condition. Changes shown to existing condition under each alternative would be the result of the proposed action and also of other reasonably foreseeable future actions.

Table 3-2. Structural stages in the Missouri Heli Bug Project area, by alternative.

	Existing		No Action		Alternative 2		Alternative 3	
Structural Stage	**Appx. Acres**	**%[1]**	**Appx. Acres**	**%[1]**	**Appx. Acres**	**%[1]**	**Appx. Acres**	**%[1]**
Shrub/Seedling/Sapling	116	12	142	15	157	17	142	15
Pole/Small-medium Timber	534	57	509	54	494	53	509	54
Mature/Large Timber	212	23	211	23	211	22	211	23
Old Forest	0	0	0	0	0	0	0	0
Allocated old growth	75	8	75	8	75	8	75	8
Recruitment old growth	0	0	0	0	0	0	0	0

Table 3-3. Cover types in the Missouri Heli Bug Project area, by alternative.

	Existing		No Action		Alternative 2		Alternative 3	
Cover Type	**Appx. Acres**	**%[1]**	**Appx. Acres**	**%[1]**	**Appx. Acres**	**%[1]**	**Appx. Acres**	**%[1]**
Douglas-fir	427	45	427	45	392	42	407	43
Grand fir	85	9	85	9	84	9	84	9
Western Hemlock	55	6	55	6	55	6	55	6
Western Red Cedar	203	22	203	22	203	21	203	22
Ponderosa Pine	0	0	0	0	0	0	0	0
Western Larch	83	9	83	9	83	9	83	9
Lodgepole Pine	0	0	0	0	0	0	0	0
Western White Pine	84	9	84	9	120	13	105	11
Mountain Hemlock/ Subalpine fir	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0
Non-Forest	0	0	0	0	0	0	0	0

1 Percentage represents the percent of National Forest Land within this project area.

As can be seen in the above tables, changes in stand structure and species composition as a result of the proposed alternatives would affect only about 2 to4 percent of the project area. This is to be expected since the project is small in scope. Under Alternative 2, this improvement in long term species composition is maximized which as recommended by the Interior Columbia Basin Ecosystem Management Assessment and the Forest Plan.

Cumulative Effects Under Alternative 1 (No Action)

Currently, 18 percent of National Forest System lands within the project area are dominated by early seral species, in this case white pine, compared to an historic level of over 50 percent for the Coeur d'Alene basin. Alternative 1 would not increase the acres in early seral species.

Currently, 23 percent of National Forest System lands within the project area are in mature structural stages, which is well below historic levels of 46 percent for the Coeur d'Alene sub basin. These stands are generally dominated by Douglas-fir, grand fir, cedar and hemlock while historically these stands would have had a substantial component of white pine and larch with some ponderosa pine in the drier sites. Most of the mortality occurred in stands classified as immature sawtimber, or stands less than 100 years of age.

There are 75 acres of allocated old growth within the project area. Bark beetle activity is moderate within this stand, with some areas heavily infected. This old growth area will provide some long-term snag habitat within the project area.

Cumulative Effects Under Alternative 2 (Proposed Action)

Under Alternative 2, early seral species would be planted on approximately 36 acres (65 percent of the harvest acres) following salvage harvest and site preparation burning, increasing the acres in early serals (white pine, larch) from 167 to 203 acres as a result of the proposed action, a 3% increase. These stands would be more likely to provide a long-term improvement in stand structure, since early seral species are less susceptible to root disease than Douglas-fir and grand fir. Nineteen acres (35 percent of the harvest acres) would be salvage harvested to remove dead and dying trees. Salvage harvest would not improve seral species composition or affect forest structure class on those acres. Salvage and regeneration treatments would reduce risk of stand replacing fires on 55 acres. There would be a reduction in standing dead and future down wood component over the 55 treatment acres.

There would be a 15-acre decrease in small to medium class forest structure from timber harvest under this alternative. There would be no affect to old forest structure or allocated old growth with this alternative.

Cumulative Effects Under Alternative 3

Under Alternative 3, early seral species would be planted on approximately 21 acres (53 percent of the harvest acres) following salvage harvest and site preparation burning as a result of this alternative. Alternative 3 would increase the acres in early serals from 167 to 188 acres, a 2% increase. These stands would be more likely to provide a long-term improvement in stand structure, since early seral species are less susceptible to root disease than Douglas-fir and grand fir. Nineteen acres (47 percent of the harvest acres) would be salvage harvested to remove dead and dying trees. Salvage harvest would not improve seral species composition or affect forest structure class on those acres. Salvage and regeneration treatments would reduce risk of stand replacing fires on 40 acres. There would be a reduction in standing dead and future down wood component over the 40 treatment acres.

Under Alternative 3 there would be no change in forest structure beyond that created by the bark beetles. There would be no affect to old forest structure or allocated old growth with this alternative.

Cumulative Effects of Foreseeable Actions

Future site-specific proposals at the subbasin level are foreseeable based on recommendations of the science-based Interior Columbia River Basin Ecosystem Management Project, IPNF Forest Plan, and the Geographic Assessment for the Coeur d'Alene River Basin. One such project is the Beaver Creek EIS, identified for consideration in 2004. It is anticipated that the EIS will address restoration of vegetation, aquatics, and wildlife habitat, but the extent and potential treatment methods are unknown at this time. There is not sufficient information about these future activities to be able to analyze the anticipated effects under the scope of the Missouri Heli Bug project. At the time it is proposed, any such activities will be presented for public review and comment under NEPA, 36 CFR 215, and Forest Service Handbook 1909.15 (Chapter 30). There are no other future timber sales planned for the project area at this time.

Cumulative Effects on Private and Other Public Agency Lands

There is no other agency land within the project area. Private land does exist adjacent to the project area to the east, and has been partial cut in the last 10 years. This has resulted in the loss of some forest vegetation.

Effects of Opportunities Under All Alternatives

Any watershed restoration sites would eventually provide forest cover, although they would be likely to go through a prolonged period of grass, forbs and/or shrub dominance. Rehabilitation of the old mining road under consideration is not expected to significantly restrict access to the area for pruning or precommercial thinning needs. Direct control of noxious weeds and management practices designed to prevent their spread or introduction to additional areas would improve the potential for natural vegetation to colonize disturbed sites but would probably not affect forest tree vegetation.

D. Consistency With the Forest Plan and Other Applicable Regulatory Direction

Forest Plan direction (page II-8) provides that timber management activities will be the primary process used to minimize the hazards of insects and diseases and will be accomplished by maintaining stand vigor and diversity of plant communities and tree species.

In the stands proposed for treatment, harvest is primarily associated with the removal of dead and dying trees. This is consistent with Forest Plan direction for stands which are "substantially damaged by fire, wind throw, insect or disease attack, or other catastrophe may be harvested where the salvage is consistent with silvicultural and environmental standards".

Regeneration harvests are proposed for most stands in which a large component of the overstory stand basal area has been lost to bark beetles. Following site preparation, regenerated stands would be planted with seral species (white pine, larch, and ponderosa pine) to promote stand structures and species composition that reduce susceptibility to insect and disease damage. This is consistent with forest plan direction that "regeneration with species combinations that are least susceptible to root disease is the primary protection objective for the root rot diseases" and that "reforestation will feature seral tree species". All stands proposed for regeneration harvests are on lands suitable for timber production and can be adequately restocked within 5 years of the final harvest. In accordance with Forest Plan direction, stands would be regenerated with trees from seed that is well adapted to the specific site conditions and will be regenerated with a variety of species.

Seventy-five acres, or 8% of the project area, are stands being managed as allocated old growth habitat. No harvest would occur within this old growth area. These 75 acres are located within Old Growth Management Unit (OGMU) # 22. Allocated old growth comprises 3.8 percent of the timber stands in OGMU # 22. The Coeur d'Alene River Ranger district is currently managing 60,122 acres as allocated old growth (Forest Plan Monitoring Report 2000, p. 60). This exceeds the IPNF's recommendations for the Coeur d'Alene district allocation of old growth. The Forest is managing 274,899 acres as allocated old growth. This exceeds Forest Plan direction of maintaining 10% of the forest as old growth. The District is currently in the process of considering additional stands for allocation to old growth management. None of the units proposed for harvest treatment under this proposal are within allocated old growth or within stands being considered for additional old growth allocation (See Project Files – Vegetation).

There are no stands scheduled for treatment under this proposal where clearcutting was considered the optimal silvicultural treatment for the stand. There are no stands proposed for treatment that would, either alone or in conjunction with existing created openings, exceed the 40 acre opening limitation.

The National Forest Management Act (NFMA) provides that timber harvest and other silvicultural practices shall be used to prevent damaging population increases of forest pest organisms and treatments shall not make stands susceptible to pest-caused damage levels inconsistent with management objectives. The best way to achieve this is to increase the component of early seral species, as proposed under either action alternative, to provide greater diversity of native tree species across the forest landscape.

All stands proposed for regeneration harvests are on lands suitable for timber production and could be adequately restocked within five years of the final harvest.

3.2. FIRE/FUELS

3.2.1. Introduction

Effective wildfire suppression since the 1930s and the broad scale change in species composition of the forest have resulted in fuel levels that have been building for the last several decades that are much higher than historic levels in the intermountain west. Overmature trees are succumbing to normal levels of forest pests at an accelerated rate and over-crowded understories are providing excessive ladder fuels (forest fuels, normally green foliage, arranged in a vertical pattern that enable a ground fire to climb into the tree crowns) in mature stands. On the Coeur d'Alene River Ranger District, winter storms in recent years have damaged many stands and subsequent insect attacks (especially Douglas-fir bark beetle) have killed even more trees that are adding to these fuel levels. Due to the increased number of snags, a wildfire could be more unsafe for fire fighters and it could be so intense it could be difficult to control. The resulting potential wildfires could destroy most of the trees (a stand-replacing fire). Potential high-intensity wildfires could also have severe consequences to other vegetation, soils, stream networks, and the visual quality of landscapes.

3.2.2. Regulatory Framework

The Forest Plan objective is to implement efficient fire protection and use programs based on management objectives, site specific conditions, and expected fire occurrence and behavior (Forest Plan, pages II-10, II-38). Management area standards and goals provide direction for appropriate response. Fire management plans are to be guided by the following standards:

- *Human life and property will be protected.*
- *The appropriate suppression response for designated old-growth stands in all management areas except in wilderness will result in prevention of old growth loss.*
- *Activity fuels will be treated to reduce their potential rate of spread and fire intensity so the planned initial attack organization can meet initial attack objectives.*

The Forest Plan Management Area within the Missouri Heli Bug Project Area includes goals to manage suitable lands for timber production for the long-term growth and production of commercially valuable wood products. The fire protection standard to achieve that goal is to use initial attack strategies (confine, contain and control) appropriate to achieve the best benefit based on commercial timber values. Forest Service Manual (FSM) 5150 defines fuel as combustible wildland vegetative materials, living or dead. Agency direction is to evaluate, plan and treat wildland fuel to control flammability and reduce resistance to control utilizing mechanical, chemical, biological, or manual means (FSM 5150). This includes the use of prescribed fire to support land and resource management objectives. The objectives of fuels management under this project are to:

- *Reduce fire hazard to a level where cost effective resource protection is possible should a wildfire ignition occur. Fire hazard is the potential fire behavior (intensity and rate of spread) of a fire burning in a given fuel profile and its ability to be suppressed by firefighting forces.*
- *Reduce the potential fire severity.*

Fire suppression policy from the early 1900's until the late 1970's has been that of total suppression. Only recently has fire policy been modified to recognize the importance of fire in balancing vegetation cycles within the temperate forest. The "Federal Wildland Fire Management Policy and Program Review" was chartered by the Secretaries of the Interior and Agriculture to examine the need for modification of and addition to Federal fire policy. The review recommended a set of consistent policies for all Federal wildland fire management agencies. In adopting the policy, the Federal Agencies recognized that wildfire has historically been a major force in the evolution of our wildlands, and it must be allowed to continue to play its natural role wherever possible. It was also recognized that all Agencies will not necessarily employ all identified procedures on all administrative units at all times (USDI, USDA, 1995; USDI, USDA, 1996). The severe wildfire seasons in northern California and Oregon in 1987, in Yellowstone Park and the Northern Rocky Mountains in 1988, throughout much of the West in 1994, Florida and Texas in 1998 and 1999, California again in 1999, and the Northern Rockies again in 2000, have made it clear that fire cannot be excluded from fire-dependent ecosystems. On the other hand, because of developed areas and commercial forests, it is not feasible to fully restore fire to its historic character, except perhaps in a few of the largest wilderness areas (USDA, 1996.)

3.2.3. Affected Environment

Fire was and is the major disturbance factor that produces vegetation changes in our ecosystems. If the role of fire is altered, or removed, this will produce significant changes in the ecosystem. Fire has burned in every ecosystem and virtually every square meter of the coniferous forests and summer-dry mountainous forests of northern Idaho, western Montana, eastern Washington, and adjacent portions of Canada. Fire was responsible for the widespread occurrence and even the existence of western larch, lodgepole pine, and western white pine. Fire maintained ponderosa pine throughout its range at the lower elevations and killed ever-invading Douglas-fir and grand fir (Spurr and Barnes 1980). Many ecosystems are regularly recycled by fire; life for many forest species literally begins and ends with fire. The effects of the historic disturbance factors, mostly associated with fire, and their current absence are discussed in more detail in the Forest Vegetation section of this Environmental Assessment.

The Coeur d'Alene basin historically had a variable fire regime of long interval large lethal fires mixed with shorter return interval non-lethal and mixed severity fires. Non-lethal fires are typically low severity surface and understory fires that kill 10% or less of the dominant tree canopy. Mixed severity fires are typically patchy and irregular burns producing a mosaic of different burn severities where the fire kills more than 10% but less than 90% of the dominant tree canopy. Lethal fires are often called stand replacing fires and generally burn with high severity. They are commonly but not always crown fires and kill 90% or more of the dominant tree canopy.

In addition to cycling carbon and nutrients, the infrequent large lethal fires played a dominant role in resetting the successional sequence and structuring the vegetation matrix across the landscape. However, the non-lethal and mixed severity fires were also important. Most stands within the Coeur d'Alene Basin apparently experienced an average of one to three of these low severity burns between lethal fires. These lower severity fires would reduce ground fuels, reduce ladder fuels, thin stands, and favor larger individuals of fire resistant species (larch, Douglas-fir, and ponderosa pine), than if these mixed severity and non-lethal fires had not occurred.

Lower severity fires structured how the landscape responded when a lethal severity fire did occur. The lower severity fires increased the proportion of the landscape with big trees and open canopies that would not sustain a crown fire. Reduction of ladder fuels would mean that even high intensity fire might not reach tree canopies in some cases. The larger trees that grew as a result of this thinning by fire would be more likely to survive even intense fires. The net result would be that even most lethal severity fires would be likely to leave more individual residual trees and patches of residual trees than if the lower severity fires had not

occurred. The effects of lethal fire events would therefore be less uniform as a result of the lower severity fires.

The Missouri Bug project area is primarily comprised of warm moist forest types with a minor amount of transition type forest that possess most of the features of both dry and moist forest types. Historically, large lethal fires that occurred at intervals of approximately 140-250 years had the greatest influence on stand structure and the landscape in moist forest types. The last documented stand replacement fire in the Missouri Bug project area took place in the late 1880s.

There are several reasons for the departure from historic stand structure now evident in this area. Early timber harvests typically were "high grade" selection harvests removing only the large valuable tree species. This resulted in major stand conversions to dense, uniform, grand fir, hemlock, and Douglas-fir stands where the large fire-resistant trees such as ponderosa pine and larch were no longer present. The introduction of white pine blister rust disease from Europe resulted in devastating losses to white pine which was a prime component of warm/moist forest types. This too contributed to the major stand conversion mentioned above. Since the late 1930's fire control efforts became much more effective. The primary impact of fire control has been to eliminate underburns and mixed severity fires, which served to thin out stands and reduce, fuel loads.

Although increases in volume and stocking are not as evident in moist forests as in dry and transition forests, some excessive fuel buildups have developed. Fuel accumulations associated with blister rust mortality can be substantial, and increasing accumulations of dead Douglas-fir and true firs associated with root disease mortality is expected. Additionally, conversion of tall, well-spaced white pine to low, densely stratified fir results in hazardous fuel ladders. Thus, significant changes in fire behavior are also a characteristic of modern-day, moist interior forests. Such changes in fire behavior threaten future fire control and place neighboring forest ecosystems at risk (Harvey, 1984, page 88).

Transition forests (warm, dry to warm, moist) possess most of the features of both dry and moist forests. Landscapes were historically a complex patchwork of stands resulting from fires that produced both lethal and nonlethal effects. Due primarily to the influences of fire exclusion and selective logging, as discussed above, modern day transition forests are far more homogeneous than historical forests. Loss of landscape diversity is primarily associated with increasing dominance and layering of shade-tolerant species in stands previously dominated by open-growing ponderosa pine or other seral species. On areas that transition to moist forest types, the historic forest species composition was mixed, with pines and larch playing a more dominant role than that of today. Mixed severity fires are now an improbable occurrence in many transition forests (Harvey, et al 1995, USDA 1999).

A significant change from common historic patterns is indicative of unhealthy conditions. Application of this concept to most north temperate and boreal forests characteristic of the western interior of the United States suggests many are unhealthy, especially where historical fire regimes have been significantly interrupted (Harvey, 1984, U.S. GAO, 1999a and 1999b).

For more information on fire severity, return intervals, fire history, and fire effects on forest types in the Coeur d'Alene basin see the Fire/Fuels section of the Douglas-fir Beetle EIS (IPNF, 1999, pages III-219 to 235).

3.2.4. Environmental Consequences

A. Methodology

Of primary concern to fuels management is the long-term fuel loading increase and subsequent changes in fire intensity and severity that may occur as a result of forest pest activity. The Douglas-fir Beetle EIS (IPNF, 1999) did an in-depth assessment of the effects of bark beetle mortality on fire behavior. That project used

the Forest Vegetation Simulator with the Fire and Fuels Extension (FFE-FVS) to predict the effects of various vegetation management actions on future forest fire behavior and severity, and used the BEHAVE model to predict rates of spread and intensities. In addition, site-specific studies were made 10 years after identification of previous beetle outbreak locations. A full description of the model is provided in the Fire/Fuels section of the Douglas-fir Beetle EIS (IPNF, 1999, pages III-219 to 235).

B. Direct and Indirect Effects

Direct and Indirect Effects Under Alternative 1 (No Action)

Alternative 1 is the No-Action Alternative, under which there would be no change from current management direction or from the level of management intensity. Timber harvest, fuels reduction, and vegetative restoration would not be initiated at this time. The effects analysis for Alternative 1 reflects existing conditions and the anticipated effects if no actions are taken.

Direct and Indirect Effects Common to All Alternatives

Once forest canopies are opened, structural changes begin to take place in the surface vegetation. As more sunlight reaches the ground, more grass and brush species can grow and conifer regeneration begins. Fuel models used for estimating fire behavior would also change. In adjacent portions of the stands that were unaffected by the Douglas-fir beetle and root disease, the stands represented closed canopy timber stands (fuel models 8 and 10). Fire in the portions of these stands affected by the Douglas-fir beetle would now react as a shaded grass fuel model (model 2) or a brush model (model 5 or 6). This condition would last for several years. Rates of spread would increase compared to a model 8 or 10 (please refer to the table below). Since the stands would be more open, atmospheric conditions would have more effect on the fuel, fuels would dry quicker and more wind could penetrate the forest canopy to fan flames.

Trees that are killed will stand for several years and therefore will not immediately become available ground fuel that would influence fire activity. By 15 years all branches and large limbs will have fallen and approximately 50 percent of the snags will have fallen also; greater than 90 percent of the snags will fall within 35 years (USDA, 1998b). The fuel accumulation rate will far exceed the decay rate for several decades. In affected stands, within 10 to 15 years, fuel conditions will start to resemble a fuel model 10 (a timber stand with heavy down material and fuel ladders that enable a surface fire to climb into the crowns) or a fuel model 11 or 12 (a stand with heavy debris, often referred to as a slash model). Since the stands would still be fairly open and contain more grass and brush or regeneration than a dense timber stand, spread rates may resemble a grass or brush model while intensities may start to resemble that of a fuel model 10, 11, or 12. These conditions are similar to those found by Leiberg (1897) that historically contributed to severe stand-replacing fires in the Coeur d'Alene basin.

Values in the table were predicted using the BEHAVE model and constant weather and fuel moisture conditions to show changes in fire behavior as fuel models change. Two sets of values were used for calculations. The first set represents burning conditions commonly found during normal summers in the inland Northwest and the second set represents burning conditions commonly found during drought conditions (NWCG, 1992). The differences between a fuel model 8 and a grass model 2 or brush model 5 or 6 is even more pronounced during drought conditions.

Table 3-4. Estimated rate of fire spread and flame length, during normal and drought conditions.

Fuel Model	Rate of spread[1] (chains per hour) normal/drought	Flame length[2] (feet) normal/drought
2	25/32	5.3/6.3
5	11/27	3.4/6.7
6	28/34	5.6/6.4
8	2/2	1.0/1.2
10	7/10	4.5/5.7
11	6/7	3.4/3.7
12	13/15	7.9/9.0

1 Rate of spread. *Forward rate of spread of the fire, expressed in chains per hour. One chain equal 66 feet.*
2 Flame Length. *The distance measured from the tip of the flame to the middle of the flaming zone at base of the fire, is valuable in determining type of resources necessary to fight fire by direct attack methods. Hand crews can normally suppress fires with flame lengths up to 4 feet, equipment is necessary when flame lengths are between 4 and 8 feet , aerial support is needed for fires with flame lengths up to 11 feet. Direct attack is not effective on fires with flame lengths over 11 feet.*

Similar changes in ecosystem structure in the past have undoubtedly contributed to fires, from lethal stand-replacing to low severity underburns, that recycled inland ecosystems. However, prolonged buildup of fuel may eventually lead to fires more catastrophic and destructive to the site than typically occurred in the native forest. Fuel loadings and flame lengths of a wildfire would be expected to increase over time as a forested stand matures and surface fuels accumulate faster than the decay rate. Because of bark beetle induced changes in stand structure, these changes would occur at an accelerated rate. The immediate effect would be for increased wind penetration into forested stands, which in the event of a fire start, would increase flame lengths and rates of spread. In successive years, the effects of surface fuel loading changes as portions of limbs and tops from the beetle killed trees fall to the ground. As the dead fuel accumulation from the beetle killed trees slows, increases in regeneration provide fine fuels necessary to maintain flame lengths and spread rates. After fire occurrence, the fuel loading and potential flame lengths would be reduced while fuel accumulated from trees killed by the fire. After several years of fuel accumulation, the potential would rapidly increase, which would explain the repeat burns historically common to inland forests (Leiberg, 1897; Zack and Morgan 1994). Following these reburns, the potential intensities would be lower for many years as forests became reestablished.

The increase in snag component associated with beetle mortality can also make it difficult to suppress fire when they are small. High snag densities may not allow for safe firefighter conditions. This may result in hand crews having to rely on indirect attack methods. This may allow fires to increase in size and intensity and make them more difficult to control.

Root disease results in a similar change to stand conditions and fuels models as occurs with bark beetles, though it occurs over an extended period of time. The stands are gradually opened up increasing the rate of spread with the growth of brush and regeneration. Fire intensities are still quite high with large fuels present from mortality to the overstory trees. The amount of dead does not occur all at once as with bark beetle mortality. However, it still contributes at a faster rate than decay.

Direct and Indirect Effects Common to Both Action Alternatives

Timber harvest would significantly affect both short and long-term fuel loading in beetle-affected areas. Timber harvest converts unavailable aerial fuels into available surface fuels. Thus the risk of crown fire may be reduced while the risk of surface fire can be increased by adding fuel to the ground. In the short term there

would be an increase in surface fuel loadings in order to decrease long term fuel loadings. An increased fire hazard and risk of ignition from timber harvest may result. Treatment of created fuels can reduce these risks. The potential for a fire outside of proposed harvest areas, the overall fuel mosaic on the landscape, and future vegetation and fuel succession must be considered when planning fuels treatments. The treatment of fuels in the harvested stands would certainly reduce potential fire severity and help reduce potential damage to soil productivity. Reducing fire severity would also increase the probability of more vegetation surviving a wildfire.

Any type of human activity increases the possibility of ignition and wildfire. Common ignition sources include equipment operation, smoking and arson. The timber purchaser will be required to have fire equipment and to take necessary fire precautions to prevent a wildfire from occurring. In the event of extreme fire conditions, the harvest activities would be regulated or suspended until conditions improve. The timber sale administrator closely monitors the fire prevention requirements of the timber contract throughout the timber harvest operations.

The preferred fuels treatment for all units that contain fire resistant species is underburning or jackpot burning. In units were fire resistant species are not present, vegetative manipulation to remove smaller diameter trees and slash pullback from the base of the larger trees is an option so that underburning can still be accomplished with the desired end result. Hand piling and burning is also a very effective fuels treatment, however costs per acre are extremely high. Where the size of the harvested area is very small or where relatively few trees are removed, fuels treatment may be limited to lop and scatter or top attached yarding.

The Douglas-fir Beetle FEIS (IPNF, 1999) modeled three different fuel treatment scenarios. These scenarios included salvage logging with two different slash treatment prescriptions, yarding of tops and lopping tops. The third scenario was a regeneration harvest system, shelterwood with reserves, followed with underburning. A jackpot burning fuel treatment would be similar to an underburning treatment, but only concentrations of fuel would be burned, instead of attempting to reduce all fuel over the entire harvested area. Salvage logging, with no prescribed fire treatments would increase potential flame lengths over the short term. This is because when these trees are harvested, all fuel would be on the ground instead of accumulating more slowly, as under the No-Action Alternative. However, over the long term, salvage logging will reduce the future tonnage of fuels on the ground which will reduce fire intensity.

A lop and scatter treatment, while not reducing the residual fuel load, is designed to get fuel reduced to ground level, thus increase the rate of decomposition and decreasing the length of time that these fuels could contribute to potential increased severity should a wildland fire occur. Yarding tops would reduce fuel loadings and potential flame lengths somewhat but would not eliminate the increases, as with burning options. It was estimated that yarding tops would only remove 50 percent of the tops of harvested trees as dead Douglas-fir would be more brittle than green trees so breakage of tops and limbs would be significant. Removal of all logging slash would not totally eliminate the potential for increased flame length should a fire occur because the extent of mortality would provide more open stand characteristics allowing increased wind and solar penetration.

Regeneration harvesting, followed with underburning appears to be the best treatment to reduce fuel loads and reestablish seral species. Underburning would significantly reduce the fire intensity over the short and long term and the rate of spread over the short term. Maintaining seral species is an important step in sustaining forested environments that can adapt and sustain disturbances within the range of natural variability. (Effects of these action alternatives on changes to structural stage and species composition are discussed in the Vegetation section of this EA.) Other treatments would be relatively the same over the long term; however, in the short term, the removal treatments would be better than the lop and scatter method. Removal would decrease fire severity and, to a lesser extent, fire intensity. This would give initial attack forces a better opportunity to control fires in the initial attack phase of fire suppression activities. The deciding factor in choosing which treatment to apply may be dependent upon the number of trees salvaged and risks to other

values compared to the cost of the treatments. See the Fire/Fuels section of the Douglas-fir Beetle EIS (IPNF, 1999) pages III-215 to 235 for more information on the effects of these treatments. This project tiers to that assessment. The reduction in snag component associated with the salvage of beetle-killed trees, under alternatives 2 and 3, would improve firefighter safety. This may give hand crews the ability to directly attack a fire start in this area so that contain and control objectives can be achieved before a fire increases in size.

Direct and Indirect Effects Under Alternative 2

Under Alternative 2, underburning would occur on 36 of the 55 acres proposed for treatment. Nineteen acres would be proposed for lop and scatter treatments. This alternative provides the most aggressive fuels reduction options. This alternative also provides for the opportunity to re-establish seral species on 36 acres which would improve the sustainability of the forest ecosystem.

Direct and Indirect Effects Under Alternative 3

Under Alternative 3, underburning would occur on 21 of the proposed 40 acres. Nineteen acres would be lop and scattered. Lop and scatter treatments would put the smaller diameter fuels on the ground for more rapid deterioration but would not reduce the increase in short term fuel loads as a result of the salvage activity. Twenty-one acres would also be planted with long-lived seral species with this alternative.

C. Cumulative Effects

Cumulative Effects Common to All Alternatives

The effects of the Douglas-fir beetle on infested forested areas will be an acceleration of successional changes that the areas are currently going through. The projected infestation on the project area is confined to approximately 200 acres within 937 total acres. Of these 200 acres, approximately 25 percent have significant mortality. As a percentage, this is rather insignificant and would not likely, in itself, lead to catastrophic large stand-replacing wildfires in the project area. Most large stand-replacing fires on the Idaho Panhandle National Forests are wind driven or the result of regional climatic patterns, higher fuel loadings from beetle-killed trees would have minimal affect on such an event once it occurs. The scattered nature of regeneration units with underburning also would have minimal affect on such an event. The treatment acres are too small to serve to stop a large running crown fire. The regenerated acres, though moving the drainage in the proper direction do not significantly contribute to restoration of historic species composition. The larger regeneration units within the Scott Gulch drainage are providing a favorable trend toward a more historic species composition, though still fragmented in occurrence.

Cumulative Effects Common to Both Action Alternatives

It is indeed true that catastrophic fires are generally wind driven or the result of climatic patterns such as drought, however catastrophic fires must have an ignition source. Treatment of these areas would reduce fire intensity and under both action alternatives, over the short term, rate of spread within the regeneration treatment areas. This may allow firefighters to contain and control a small fire before it becomes a large one. Reducing fire intensity in even small areas may improve the chances of firefighters to contain and control a small fire start in conditions that would otherwise lead to a catastrophic fire occurrence. Reducing the snag component may also allow for a direct attack by firefighters that could serve to keep a fire start small during conditions that might otherwise lead to a catastrophic fire occurrence.

Cumulative Effects of Activities on Private Lands

Although there is no private ownership within the project area, there are private lands immediately adjacent to the project area. General wind patterns are toward the urban interface area. A wildfire in the project area

could have a effect on private ownership, mainly from a large catastrophic fire driven by the western prevailing winds that could put private lands at risk. Topographic features and access should help keep fires from affecting the private ground in most cases. Natural disturbance regimes included severe and rapidly moving forest fires that sometimes exceeded 100,000 acres. While the full range of historic fire regimes was a functional part of the historical natural ecosystem, we are now operating in an environment of a changed human context. Returning to the full range of historic disturbance patterns would generate significant threats to human life and property. Even smaller threats (i.e. "Fire Storm 91") have not been acceptable to the public. A small fire without the effects of wind and weather would generally burn uphill and away from the private land. Fire starts within the project area would be aggressively fought because of the presence of private ownership and home sites within the Beaver Creek drainage.

Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions are listed in Chapter 2. Ongoing activities associated with salvage, site preparation, and reforestation of Beaver Heli Bug and Small Sales EIS units will reduce fuel loadings over a small areas south and east of the project area and move the drainage toward more historic timber species composition, however these actions will only result in changes at a stand scale. Disturbances similar to historic proportions would be necessary to facilitate the vegetation restoration that is needed to change trends in potential fire intensities and severities. Obliteration of roadways may result in a small decrease in man-caused fires but of increasing concern is the decrease in efficiency of fire suppression access.

Fuelwood gathering will reduce some of the dead wood component in the drainage but it is very limited in scope, within short distances of open roads, and would have no effect at the drainage level. Fuelwood gathering activities could increase the risk of a human-caused fire start in the drainage.

The Hither and Yon Beetle proposal is similar to Beaver Heli Bug and the Small Sales EIS in treatment and scope so changes will again occur at the stand scale. The Beaver Creek EIS is a landscape level project which has a greater potential to facilitate vegetation restoration and change trends in potential fire intensities and severities within the Beaver Creek drainage.

Logging activities on private ownership in the headwaters of Beaver Creek are not expected to have any significant impact on fire risks in the drainage. Salvage logging to keep dead components low would improve fire control efforts. Commercial thinning over the long term would be beneficial to reduce future fuel loads but may result in a short term increase in fire intensity.

Effects of Opportunities

Decreasing the road density may result in a small decrease in human caused wildland fires, although the change may not be noticeable because there would not be a significant change in road densities or use patterns on the travel zones that have the highest ignition density. On the opposite side, any road obliteration will tend to decrease efficiency of fire suppression access, potentially allowing fires to grow in size and intensity prior to the arrival of initial attack resources.

Noxious weed treatment and monitoring would have no effect on wildland fire intensities in forest fuel types. If spotted knapweed were to invade and dominate surface vegetation in dry open forest types and meadow types, a reduction of fire intensity could be expected. Spotted knapweed out-competes native grasses and does not burn well. In areas where knapweed infestations are reduced in these types, fire intensities could be expected to increase in the event of wildland fire.

Cumulative Effects At The Forest Level Scale

The effects of 100 years of past human activity on inland forested ecosystems has resulted in a significant change from historic patterns and is indicative of unhealthy ecosystem conditions. Prior to 1960 many upland areas were high-grade logged removing only the valuable species, resulting in major stand conversions to grand fir, hemlock, and Douglas-fir. Since the late 1930s, fire control efforts have become effective. The primary impact of fire control has been to eliminate underburns and mixed severity fires which served as the thinning agents that favored larch and ponderosa pine. In 1909 white pine blister rust was accidentally introduced to western North America. This Eurasian disease devastated white pine forests in north Idaho (Zack 1995).

Because of this change in species composition and structure, low and mixed severity fires are now an improbable occurrence in many forests; severe stand replacing fires are more likely. The No-Action Alternative does not take any steps to interrupt this trend. Under the action alternatives large fuel removal and various fuel treatments would occur to reduce fuel accumulations, reintroduce seral species (ponderosa pine, white pine and larch) where present levels of stand mortality make this desirable, and makes progress towards reducing potential intensities and severities of wildfire in some stands. Even with this treatment, untreated areas and areas treated with salvage harvest only will continue to trend toward conditions that favor potential high intensity wildland fires. Only the action alternatives will reduce high snag densities and address the problem of firefighter safety.

D. Consistency With the Forest Plan

The goal of the Forest Plan is to provide efficient fire protection and fire use to help accomplish land management objectives (IPNF Forest Plan, Chapter II, pages II-10 and II-38). Under Alternative 1, no fuels treatment would occur beyond that already ongoing or planned under other projects. The continued succession of fuels and vegetation, mortality from insect disease, and the exclusion of fire will create areas where the trend in fire behavior characteristics will in time exceed the goals, objectives and standards established in the Forest Plan.

Both action alternatives propose various forms of fuels treatment and make progress towards reducing the potential intensities of wildfire. Since the proposed treatments are small in scope, even with this treatment, untreated areas and areas treated with salvage harvest alone will continue to trend toward characteristics that exceed the goals, objectives and standards established in the Forest Plan. Treatment of the activity fuels will moderate the near term fire risk due to the bark beetle attacks and root disease losses, however vegetative manipulation techniques to shift stand composition to fire resilient species is important to appreciably alter long term fire risk and consequences. Though small in scope, Alternative 2 best addresses this long-term fire management goal.

3.3. FINANCES

3.3.1. Regulatory Framework

Forest Service policy sets a minimum level of financial analysis for timber sale planning (see Forest Service Handbook 2409.18 section 32). The level of timber harvest is important not only in providing jobs in the timber industry, but also through indirect and induced impacts on other business sectors as well (Forest Plan, page IV-47). One of the seven major issues for the IPNF's Forest Plan EIS was community stability (Forest Plan, pages 1-8).

3.3.2. Financial Setting

Within northern Idaho, the Forest Service has been contributing about 11 to 12 percent of the timber that was on the local market the last few years. This figure is down from approximately 33 percent of the timber harvested during the late 1980s - early 1990s.

Based on the most recent information at the Forest level (TSPIRS, 1998), each million board feet of timber harvested on the Idaho Panhandle National Forests (IPNF) annually results in a total of 39.2 jobs and $1,158,000 income for that year. These figures include the impacts associated with harvesting and processing timber plus the impacts of Forest Service salaries and investment and the 25% fund expenditures.

Over past years timber markets have been down as a result of the Asian economic problems and raising of interest rates by the US Federal Reserve Board. However, in recent months the Reserve Board has reversed it's position and has lowered interest rates. This is expected to stimulate housing starts and will likely result in an increase in delivered log prices at local mills. Recent changes in trading agreements with Canada resulted in an increase in imports from our neighbor to the north. This latest change did depress the local markets during the winter months. However, recent request for delivered log prices show that the market is rebounding.

District sales of Douglas-fir timber by the Forest Service during 1999 and 2000 have brought bids averaging $126 per thousand board feet for the Douglas-fir beetle killed timber (Project File – Finances). This figure is for sales that contained a high amount of helicopter yarding and generally high brush disposal costs, similar to this project. Bid prices are expected to remain stable or slightly increase this year.

3.3.3. Financial Consequences

A. Methodology

Each action alternative was run through the current Transactional Evidence (TE) appraisal system to determine expected bid rates. The TE appraisal system is used to determine the selling values when timber sale contracts are developed. Other costs, such as road maintenance, fuel reduction/site preparation (burning), and planting, were developed based on experienced District costs. This project plans vegetative restoration and fuels reduction treatments on the landscape using primarily helicopter yarding systems. It is an investment and would not be expected to generate much economic return.

Based on past bidding results from previously offered beetle-killed timber, small helicopter or mixed system offerings do sell but they are not bid up beyond the minimum bid due to the fact that there is limited competition for these sales. Small operators do not have access to helicopters and larger mills do not bid on small quanities of timber. This has been factored into the analysis of this project. Non-commodity values were not included in this analysis because these resources are evaluated under the specific resource section. Title 40, Code of Federal Regulations for NEPA (40 CFR 1502.23) states, "For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are qualitative considerations." Effects on resources are documented in individual resource sections.

The description of the features of the alternatives presented in Chapter 2 was used for the financial analysis. The following table presents costs for this project, based on the time line identified in Chapter II. These cost include inflation and overhead where appropriate. Cost of some activities not planned under this project were included in this table for comparison purposes.

Table 3-5. Cost Estimates for Proposed Activities.

Project Activity	Cost	Per Unit
Roads: Timber Sale		
Road Maintenance (During Sale)	$0.54	/mile/mbf
Fuel Treatment: Purchaser		
Helicopter Yarding Tops	$40.00	/MBF
Skyline Yarding Tops	$10.50	/Acre
Slash Unmerchantable and Brush/Prep. for Underburning	$100.00	/Acre
Grapple Pile slash with a machine (excavator)	$250.00	/Acre
Pile slash at landings	$667.00	/Acre
Burn slash at landings	$100.00	/Acre
Fire Line constructed by hand	$101.00	/Chain
Fire Line constructed by machine	$55.00	/Chain
Lop and scatter (cost reduced for low volumes per acre)	$25.83	/Acre
Leave Tree Protection	$55.00	/Acre
Fuel Treatment: Forest Service**		
Burn slash at landings	$135.67	/Acre
Underburn in units for slash reduction and site preparation***	$244.21	/Acre
Jackpot burn in units for slash reduction	$244.21	/Acre
Hand Pile	$1,628.04	/Acre
Burn Hand piles	$135.67	/Acre
Erosion Control		
Seed Skidtrails & Landings (Purchaser)	$59.00	/Acre
Seed & Waterbar Roads	$200.00	/mile
Noxious Weeds Control (Purchaser)	$281.00	/Acre
Essential Regeneration**		
Planting (8x8 ft spacing)	$611.85	/Acre
Stocking Surveys (3 each per acre planted)	$57.14	/Acre

*** Includes overhead.*

**** for this site specific project, assessment showed that due to location and type of burn desired, jackpot burn costs would more closely approximate what will be needed to accomplish these underburns, see Project Files (Finances).*

B. Direct and Indirect Effects

Timber harvest under the action alternatives, though small in quantity, would contribute to continuing operation of local mills, thus, directly and indirectly enhancing the local and state economy through employment and tax revenues. These economics may also be enhanced through employment created through reforestation needs identified. Additionally, 25 percent of gross timber receipts will likely still be directed to Kootenai and Shoshone Counties, Idaho, for public schools and roads.

It is anticipated that the sale of timber from National Forest System lands would have very little effect on the price that private land owners will receive for their timber because the timber in this proposal would be part of the IPNF's normal timber program and constitutes only 11-12 percent of the local market.

Table 3-6. Cost/revenue table.

Timber Sale Revenue	Alt. 1	**Alt. 2**	**Alt. 3**
(1) Stumpage Value (gross)	NA	$68,717*	$47,585*
Total MBF	none	445	251
(2) Total CCF	none	890	502
Timber Sale Costs Affecting Predicted Bid	**Alt. 1**	**Alt. 2**	**Alt. 3**
(3) Road maintenance (during sale)	$0	$1290	$1290
(4) Road reconditioning	$0	$0	$0
(5) New road construction			
a) Permanent road construction	$0	$0	$0
b) Temporary road construction	$0	$0	$0
(6) Road reconstruction			
a) Brushing, ditch and shoulder earth work:	$0	$0	$0
b) Upgrading existing culverts:	$0	$0	$0
c) Install/remove culverts in closed roads	$0	$0	$0
d) Install gates on roads presently closed	$0	$0	$0
(7) Road obliteration and wildlife-related road closures -Sale Contract	$0	$0	$0
(8) Seed skid trails and landings	$0	$89	$89
(9) Slash disposal/site prep (Purchaser)	$0	$667	$667
a) Safety snagging on helicopter units	$0	$180	$180
(10) Slash disposal/site prep (FS)	$0	$12,832	$7,148
(11) Noxious weed control (Purchaser)	$0	$0	$0
(12) Total sale contract costs (sum of lines 3 through 11)	NA	$15,058	$8,707
(13) Predicted (high) bid value (subtract line 12 from line 1)	NA	$53,659	$38,877
a) Roll back factor (increases likelihood of sell to 95%)	NA	-$16,607	-$9,367
(14) Predicted (net) bid value (subtract lines 13a from 13)	NA	$37,052	$29,510
(14a) Predicted bid/CCF (line 14 divided by line 2)	NA	$42	$59
Other Project Costs	**Alt. 1**	**Alt. 2**	**Alt. 3**
(15) Reforestation	$0	$24,084	$12,849
(16) Road obliteration and instream work (FS) for watershed restoration	$0	$0	$0
(17) Road closures for wildlife security (FS)	$0	$0	$0
(18) Total Other Project Costs (add 15 thru 17)	$0	$24,084	$12,849
(19) Minimum bid (per mbf) that would fund all other projects (divide line 18 by line 2)	NA	$27	$26
(20) Difference between predicted and minimum bid (per CCF) (Subtract line 19 from line 14a)	NA	$15	$33
Other Forest Service Costs	**Alt. 1**	**Alt. 2**	**Alt. 3**
(21) Planning	$20,000	$20,000	$20,000
(22) Sale preparation	$0	$6,230	$3,514
(23) Harvest and engineering administration	$0	$1,566	$884
(24) Net value (subtract lines 18, 21, 22, and 23 from line 14)	-$20,000	-$14,828	-$7,737

** the gross stumpage value is derived from Transaction Evidence (TE) appraisal runs. See Project Files (Finances) for this and other cost basis data.*

Either action alternative would finance all of the proposed treatment activities and reforestation, although neither would be required to finance the full cost of reforestation (Forest Service Handbook 2409.22, R1 Amendment 2409.22-97-2). The timber sale would not be required to finance the reforestation of existing low stocking areas as a result of mortality to bark beetles, root disease, or blister rust. It is estimated that the timber sale developed under Alternative 2 would be required to finance 30% of the amount on line 15 in the table above. Under Alternative 3, the sale would be required to finance 10% of the amount on line 15. Alternative 3 would provide the greatest net economic return after all costs are subtracted. Alternative 2

would provide for the greatest investment return in re-establishing pine and larch species back into the ecosystem while meeting direction in the Forest Plan and Upper Columbia River Basin Assessment.

Both alternatives would generate a negative net value when looking at the project as a whole, primarily due to planning costs. Planning costs for a small project such as this are higher than in the past because of the current level of analysis needed. This project must be analyzed in an environmental assessment where as in the past it would have been categorically excluded from documentation in an environmental assessment. However, as previously mentioned, since the timber sale generated by each alternative would not be required to carry the full cost of planting, the timber sales would actually have a positive net value.

Funding for Opportunities

Either action alternative would likely be able to fund the opportunities listed in Chapter 2.

Timber Management Financial Viability

Implementing stand-management treatments can depend on having financially viable timber sales that the local forest products industry is willing to purchase. For such an analysis, all identifiable costs associated with timber sales (including administration, planning, sale preparation, and sale execution) were included.

Table 3-7. Cost/Revenue Summary.

	Alt 1	Alt. 2	Alt. 3
Stumpage Value (gross)	$0	$68,717	$47,585
Stumpage minus contractual costs	$0	$53,659	$38,877
Minus competition adjustment	$0	$37,052	$29,510
Remainder minus planting costs	$0	*$12,968	*$16,661
Remainder minus sale prep costs	-$20,000	-$14,828	-$7,737

The above table reflects the full cost of planting. As stated earlier, any timber sale generated by these alternatives would not be required to carry the full planting cost. Brush disposal and site preparation are included in contractual costs. If negative after planting costs, it represents a deficit sale. If negative after sale prep costs, it represents a below cost sale. Neither timber sale generated by the alternatives would be deficit.

Below-cost Sales

Both alternatives would be considered below cost. This is because each alternative is considering the project as a whole, with full planting costs. The timber sale that would be generated by each alternative, would actually not be below cost because each sale would only be required a portion of the cost of planting. However, generally we would pay for the reforestation, even if not required, with timber receipts since the sales are positive enough to finance it.

Another factor that is driving down the economics of the alternatives is the cost due to the requirement to do an environmental assessment for this small project. In the past this project proposal would have likely been categorically excluded from documentation in an EA or EIS, which would have resulted in less planning costs and a greater economic return.

C. Cumulative Effects

The timber sale considered under this proposal would be part of the volume normally offered for sale by the IPNF; thus there is not an additional volume of timber that could adversely affect the regional timber market, and thereby private landowners with timber to sell.

Not managing the timber resource in these areas (as under Alternative 1) would result in a loss of mature timber value. The majority of this timber component is dead as a result of insect infestation. A portion of the timber value and volume has already been lost. If this dead timber is not recovered, then the demands and expectations of timber supply from the National Forest will need to be made up from other areas. Both action alternatives look at reforestation of some of the areas hit hard by the beetle infestation and address productivity over the long term. Reforestation will hasten the return of these areas to high value timber stands. This directly relates to anticipated ***future*** revenues.

D. Consistency With the Forest Plan

Forest-wide goals, objectives, and standards for finances are not specifically addressed in the Forest Plan. This issue is addressed indirectly in the discussion of community stability. Chapter II of the Forest Plan states, "Management activities will continue to contribute to local employment, income, and lifestyles. The Forest will be managed to contribute to the increasing demand for recreation and resource protection while at the same time continuing to provide traditional employment opportunities in the woods product industry," (Page II-11, Objectives).

The No-Action Alternative would not meet this objective, since it does not propose any commercial timber harvest, and would not contribute to local employment or income. Both action alternatives would meet this Forest Plan direction because they would contribute, albeit in at a small scale, to the local economy and lifestyles.

3.4. WATER RESOURCES

3.4.1. Regulatory Framework

The regulatory framework for the watershed and water resources aspect of the analysis is based on the Clean Water Act and its amendments; Idaho State's implementations of the Clean Water Act; the Forest Plan, and the Inland Native Fish Strategy (INFS).

Activities will be in compliance with the guidelines in the Soil and Water Conservation Handbook (Forest Service Manual 2509.22), which outlines Best Management Practices that meet the intent of the water quality protection elements of the Idaho Forest Practices Act.

3.4.2. Existing Conditions

A. Methodology

The assessment of existing condition describes the current condition of the project area and provides a basis for comparing the effects of management alternatives. This existing condition discussion was developed from many information sources including field surveys, aerial photographs, Geographic Information Systems (GIS), hydrologic response techniques and models such as WATSED, and other watershed and aquatic data derived by the Forest Service and other sources. The assessments followed the principles and processes in the Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis, Version 2.2, August 1995. (Regional Interagency Executive Committee and the Intergovernmental Advisory Committee, Forest

Service and other federal agencies; copies are available from Regional Ecosystem Office, PO Box 3623, Portland, Oregon 97208.)

The project area was analyzed from at least two scales: the local site or tributaries where activities take place; and the cumulative effect watershed. The cumulative effect watershed (or watershed area) is the logical culmination point of water flow where the effects of the distributed project activities could possibly integrate or synchronizes over time and space and is addressed cumulatively in a larger watershed. The cumulative effects analysis includes an analysis of past, present, and reasonably foreseeable activities.

In each case, the direct, indirect, and cumulative impacts related to the alternatives of this project on streams were usually local in nature, and sometimes to the next larger tributary formed by multiple tributaries. In no case will the cumulative effects extend beyond the watershed or watershed area.

For a detailed discussion of historic hydrologic conditions, please refer to the Geographic Assessment for the Coeur d'Alene River Basin (USDA Forest Service, 1998, pages 49-56).

A summary of information specific to watersheds of the project area is provided in Table III-7, including physical characteristics, qualifications, hydrologic regime, erosion and sediment, channel conflicts, and stream crossings. An explanation of each descriptor is provided with the table.

B. Conditions in the Beaver Creek Watershed

Overview

Beaver Creek is a 41.1-square mile, fifth-order watershed, with 2.9 square miles in private ownership, that flows into the North Fork of the Coeur d'Alene River. Valley sideslopes are generally steep (50 to 70 percent) and vegetated predominately with conifers**.** Activities such as timber harvest, mining and road building has occurred throughout the watershed. The watershed status within the Beaver Creek watershed is designated as "not properly functioning" in the Geographic Assessment and listed as a 303d watershed by the Environmental Protection Agency. This status is the result of the relative sensitivity of the watershed system (its soils, and the predominance of sensitive snowpacks) and from its history of development. As previously described, these watersheds are a low priority for watershed improvement work**.**

Beneficial uses within the Beaver Creek Watershed are Salmonid Spawning, Cold Water Biota, and Recreation as listed in the 1992 Idaho Water Quality Status Report.

Within the Beaver Creek watershed, a total of 19 miles of road has had watershed improvement work completed under the Dudley, Capitol Hill, Alder Kid, Upper White, and Lower White timber sales. Work included removal of 40 road channel crossings, stabilizing unstable road sections, removal of encroaching road segments and applying erosion control. Also included was the application of erosion control and upgrading of undersized pipes to meet 100-year flows on roads that will be used for long-range transportation.

Other foreseeable activity within the Beaver Creek watershed includes the removal of dead and dying Douglas-fir associated with the Douglas-fir Beetle EIS and the Small Sales EIS. Watershed improvement work also associated with the Douglas Fir Beetle project included culvert upgrades to meet 100-year flood events. Other funded foreseeable watershed improvement associated with Kings Ridge and Unknown Pony Timber Sales includes removal of 8 miles of road and 19 channel crossings, .1 miles of encroaching road removal, fish habitat improvement, fish cover structures, log step downs, riparian planting and erosion control on 4 miles of road.

Streamflow Regime

The hydrology of the Beaver Creek Watershed and all its major tributaries has been altered by past timber harvest and road building, in four respects. First, it can be inferred, from the peak flow increases, that periods of spring peak flow are longer in duration (Troendle and King, 1983). The timing of runoff from increased water yields is dependent upon air and snowpack temperature and exposure to solar radiation, which are controlled by elevation, aspect, slope, and shading from topography and/or vegetation.

Second, data from the Idaho Panhandle National Forests and several studies (Kappesser,1991. Christner and Harr, 1982. Harr, 1981) suggest that peak flows generated by rain-on-snow events can increase substantially when the forest canopy is removed by harvest or natural disturbance. Approximately 70% of the Beaver Creek watershed is sensitive to rain-on-snow events.

Third, the effective gradient of some of the channels has been increased. This is evident in the headwater channels that have had large woody debris (pool creators) removed during timber harvest, and in the main Beaver Creek channel and several of the smaller tributaries that have been straightened by road placement. The effect of peak flows of longer duration, peak flows of increased magnitude, and increased channel gradients are increased stream power. Increases in stream power results in increased probability to create and transport sediment. Increases in monthly peak flows are elevated above natural conditions due to past timber harvest activities and road building. The equivalent clearcut area in the Beaver Creek watershed is approximately 9%.

Fourth, subsurface flows intercepted by road cuts can be rapidly routed by compacted road surfaces and ditches to stream channels causing an increase in the total runoff. This is a special concern when roads are located low in the watershed and where roads traverse clearcuts. Megahan (1983) noted that the volume of water intercepted by road cuts below clearcuts that have been burned, increased by 96 percent.

Stream Channel Stability

Encroachment by streamside roads is a dominant feature of the riparian areas in the majority of major tributaries and face drainages due to extensive mining that has occurred in the past and is ongoing. Road failures have caused excess sediment introduction through the years, including during the February 1996 flood event. Overall within Beaver Creek, encroaching road densities are estimated to be 0.02 miles per mile of riparian area, with a total of 37 miles of riparian road. Within this riparian roading, an estimate 1.20 miles of riparian road reduces stream shading to the extent that local water temperatures may be affected. As previously discussed, increased bedload supply and bed mobility can result from riparian harvest and may result in increases in streambank erosion. Within the Beaver Creek Watershed, 13 percent of the linear riparian influenced area has been directly affected by past regeneration harvest. This represents a relatively low amount of past riparian harvest within the watershed, so the effects are minimal compared, to encroaching roads and crossings failures.

Water Quality

Approximately 204 miles of road and 163 road channel crossings exist in the Beaver Creek watersheds, with road densities of 5.0 miles per square mile of land. The stream-crossing frequency throughout the watershed is approximately 2.0 crossings per mile of stream. Each of the road channel crossings, particularly on roads that are no longer maintained, have the potential to plug and subsequently fail. Within the Beaver Creek Risk Area, 44 percent of the watershed is on sensitive landtypes with high landslide and sediment delivery potential, with approximately 35 percent of the miles of road on these sensitive land types. Road channel failures and the continual bank erosion and road fill failures of the streamside road are the primary sediment contributors and component of disturbance to the lower to mid-elevation areas of the watersheds.

Table 3-8. Watershed Characteristics, Condition Indicators, and Dominant Watershed Disturbances in the Beaver Creek Watershed.

Physical Characteristics	
HUC: 1701030130	
Drainage Area (square miles)	41.1
Sensitive Landtypes (percent of watershed)	44
Sensitive Snowpack (percent of watershed)	70
Qualifications	
Is all or part listed as Water Quality Limited?	Yes
Apparent Watershed Status	Not Properly Functioning
Subwatersheds used for analysis	Missouri Gulch
Hydrologic Regime	
Estimated Peak Flow (Q2 cfsm)	25
Current Runoff Modification (percent of peak)	5
Equivalent Clearcut Area (percent of watershed)	9
Erosion and Sediment	
Estimated Annual Sediment (tons/mile2/year)	17
Current Sediment Load Modification (percent)	142
Road Density (miles/mile2)	5.0
Sensitive Road Density (miles/mile2)	1.8
Channel Conflicts	
Road Encroaching at Bankfull Stage (miles)	2.9
Riparian Road Density (miles/mile2)	0.4
Stream Crossings	
Stream Crossing Frequency (#/mile of stream)	2.0
Number of Fish Migration Barriers	3*

* *These barriers are located outside of the project area but within the cumulative effects analysis area, and are located on roads managed by the County, not by the Forest Service.*

A brief description of each of these characteristics is provided below.

Physical Characteristics

HUC (Hydrologic Unit Code): The HUC is a hierarchal watershed classification. The first 8 digits of the HUC number (17010304) represent the Coeur d'Alene subbasin. Additional digit pairs indicate watersheds and sub-watersheds delineated by the Forests. The basic analysis unit was the 6th code HUC.

Drainage Area (mi^2): The area of the watershed or watershed area being analyzed.

Sensitive Landtypes (%): Each watershed or watershed area is characterized by the percent (%) of the drainage area comprised of "sensitive landtypes" susceptible to mass erosion and increased sediment delivery to streams. As a point of reference, watersheds with more than about 30% sensitive landtypes are often very sensitive to cumulative disturbances.

Sensitive Snowpack: Mountain slopes on the Idaho Panhandle in an elevation band between 2500 and 4500 feet can produce rapid melt and runoff during warm, moist winter storms. The percentage of the watershed within this band partially characterizes the overall sensitivity of the watershed. As a point of reference, watersheds with a small proportion of sensitive snowpack (less than 30%) do not appear to be very responsive to rain-on-snow events at the watershed scale. Watersheds with a large proportion (greater than 70%) of sensitive snowpacks are often highly volatile and are very sensitive to other disturbance regimes in terms of runoff from the stream system. These parameters do not change with forest development, and therefore are not carried into the Environmental Consequences section of Chapter III.

Qualifications

Water Quality Limited Stream Segments: Section 303(d) of the Clean Water Act requires the States to list water bodies (stream segments and lakes) that do not support beneficial uses, even though BMPs are employed. These are identified as Water Quality Limited. The watershed status has been estimated based on known conditions in the watershed, its sensitivity and resilience, and the disturbance history in the drainage. The tables located in the Environmental Consequences section indicate if any part of a watershed contains one or more listed segments.

Apparent Watershed Status: The following description of current conditions of the watersheds is based on categories outlined in the Coeur d'Alene River Geographic Assessment (Geographic Assessment, pages **). For a more detailed discussion, see the "Watershed Characterization" report of that document.

- Properly functioning: Within the scope of this assessment, a properly functioning watershed system is one that is exhibiting dynamic equilibrium characteristics and whose streams are operating and responding appropriately under their current environment.

- Functioning-at-risk: A watershed system that is functioning-at-risk is one that is essentially still properly functioning. However, it may be exhibiting trends or it may contain known risks that are likely to compromise that status and the ability to fully support beneficial uses in the future. Watershed systems with this classification area the highest priority for watershed restoration and improvement (Geographic Assessment, pages 59-61).

- Not properly functioning: Watershed systems that are not properly functioning often exhibit rapid adverse trends and may not fully support beneficial uses. Watershed systems with this classification are the lowest priority for watershed restoration and improvement (Geographic Assessment, pages 59-61).

Hydrological Regime

Estimated Peak Flow (cfsm): The estimated peak flow that is expected to occur on the average about every two years (Q_2) is listed for characterization as cubic feet per second per square mile of drainage area (cfsm).

Current Runoff Modification (% of peak): The current runoff modification is shown as a percent of the "natural" peak month discharge and reflects watershed climate patterns and disturbance history (USDA Forest Service 1989, USDA Forest Service, 1996).

Equivalent Clearcut Area (ECA): The equivalent clearcut area is used as a surrogate to estimate the percentage of hydrologic openings in a watershed and accounts for vegetative recovery since the initial disturbance (USDA Forest Service, 1989; USDA Forest Service, 1996).

Erosion and Sediment

Estimated Annual Sediment (tons/mi^2/yr): The estimated annual sediment yield for natural or baseline conditions (WATSED Project Files, p. 7). If WATSED was not run for the analysis, this estimate was obtained from the Coeur d'Alene Geographic Assessment Database (USDA Forest Service 1998).

Current Sediment Load Modification (%): The estimated annual sediment yield for existing conditions expressed as a percent increase over natural conditions (WATSED Project Files, p. 7). It is an indicator of the effects of past management activities on the sediment delivered to streams. If WATSED was not run for the analysis, this estimate was obtained from the Coeur d'Alene Geographic Assessment Database (USDA Forest Service 1998).

Road Density (mi/mi^2): The road density is an indicator of watershed condition reported as the miles per square mile of roads within a watershed. Generally, road densities are high throughout northern Idaho and a trend toward lower road densities is desired for a variety of resource benefits (Integrated Scentific Assessment for Ecosystem Management in the Interior Columbia Basin Pp 67).

Sensitive Road Density (mi/mi^2): Sensitive road density is a measure similar to road density, except that the roads considered are only those on sensitive landtypes. This measure and other road stratifications are able to better explain watershed responses than road density alone.

Channel Conflicts

Riparian Road Density: Riparian road density is estimated from maps, photos, and GIS to determine road segments within 300 feet of any perennial stream. This is presented in miles per square mile.

Stream Crossings

Stream Crossing Frequency (# per mile of stream): Stream crossing frequency is the number of road crossings divided by the number of miles of stream in a watershed.

Number of Fish Migration Barriers: The number of inventoried road crossings which create fish migration barriers are listed.

3.4.3. Environmental Consequences

A. Methodology

As stated earlier, the project area was analyzed on at least two scales: the local site or tributaries where activities occur and the cumulative effect watershed. The cumulative effect watershed 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.

For purposes of comparing alternatives and analyzing the effects of each alternative, a table of watershed effects is presented. These effects include, but are not limited to, watershed restoration activities. The methods used in this section are the same as were used in the Affected Environment.

The table consists of measurement indicators and their units of measure, and the estimate of that parameter over the periods of time during and following the project for each alternative. The table is followed by a narrative discussion of direct, indirect, and cumulative effects in each watershed at the appropriate spatial and temporal scale. For a more detailed explanation of the indicators used, please refer to the "Watershed Hydrologic Response Estimate, and WATSED" discussion (See project Records, WATSED Interpretation Report, 3 pages).

Sediment Yield (%): Sediment yield, reported as the percent change above the estimated natural conditions, was estimated using the WATSED model (Project Records, Watershed Hydrologic Response Estimates and WATSED Summaries) for the year 2001. Proposed timber harvest units, road construction (if present), and site-preparation treatments are included in the analysis. WATSED does not predict increases in sediment yield associated with in-channel and stream-bank erosion due to management-induced increases in peak flows. However, the sediment levels that are the baseline for WATSED come from natural in-channel and stream-bank erosion that was a measured parameter used in preparation of the model. WATSED was not used for evaluating the effects of restoration projects.

Peak Flow (%): The change in runoff estimated by WATSED (Project Records, Watershed Hydrologic Response Estimates and WATSED Summaries) expressed as a percent change from the estimated natural peak month discharge.

Net Stream Crossings (#): The change in the number of stream crossings compared to the existing conditions. These values reflect increases from new road construction and decreases from watershed restoration activities.

Net Roads (mi): The net change in road mileage in each watershed. These values reflect increases from new road construction (permanent) and decreases from watershed restoration activities. Temporary roads (if proposed) would not be included in this calculation because they would be hydrologically inert following project activities.

Net Encroaching Roads (mi): The net change in inventoried road miles that hydraulically modify stream flows at bankfull stage. Restoration such as road obliteration can reduce this value.

Rain on Snow Analysis: No rain on snow model was run for the Beaver Creek Watershed. WATSED does not evaluate the effects of rain on snow events on in-channel and streambank erosion. However, rain on snow events are part of the precipitation patterns used in the base calculations for peak flows in WATSED. The project consists primarily of widely scattered, relatively isolated patches of beetle-infected trees with a several areas of high beetle mortality associated with root disease openings that will be regenerated. Alterations in the canopy cover from past harvest have, in all probability, altered the magnitude, timing, and duration of snowmelt in the watershed under existing conditions. However, the risk of increasing the magnitude of rain on snow events would be negligible under the Missouri Bug EA because only small new openings would be created in addition to those that would be created under the No Action Alternative (See Watsed Report, Project Records, ECA's Pp 13,16, and 19). Harvest of dead trees would be similar to the loss of forest canopy that would occur under the no-action alternative as a result of beetle mortality. No large new openings would be created. The magnitude of change for rain-on-snow events, if any exists, would be insignificant under any of the action alternatives for the Beaver Creek drainage.

Cumulative Effects Analysis on National Forest System Land: The Missouri bug project is a salvage sale within the Beaver Creek Watershed. Within the Missouri Gulch area, widely scattered, relatively isolated patches of beetle-infected trees would be harvested to salvage dead and dying trees. Some of the areas would be individual tree harvested while other areas, in which the overstory has been reduced to low levels, regeneration harvest with partial overstory retention would occur. The loss of forest canopy would be low in relation to the size of the Beaver Creek watershed.

For the cumulative effects analysis for this project, we compared the harvest proposed under Missouri Heli Bug EA with the analysis under the Douglas Fir Bark Beetle FEIS (1999). This comparison included foreseeable activities under the Small Sales EIS, which was also a salvage sale. Further analysis was completed to verify the findings under Douglas Fir Beetle EIS.

Cumulative Effects for Non-Forest System Lands: Timber harvest operations on private and other federal ownership in the headwaters of Beaver Creek has been a mix of regeneration and partial harvests. Considerable roading has occurred to access these areas. Much of the roading, in the headwater areas, is above major stream channels. Planned operations on this ownership, as shown in the foreseeable actions in Chapter II, are minor in nature and are not expected to affect conditions downstream. Since the Missouri Heli Bug project is not expected to have an effect on the watershed, the cumulative effects of private harvesting in the headwaters would not need to be considered. There is private ownership running much of the length of the Beaver Creek floodplain. This private ownership has a greater potential to create effects to the watershed. The Forest Service has no control over management on these lands, but it does ensure that the quality of the water leaving Forest Service land is improved or unchanged when it enters private land. As a result, the

cumulative effects downstream of the private land will not be degraded by Forest Service activities, regardless of how private landowners manage their land. Because of this, formal cumulative effects analysis for downstream private land would not provide useful information for the Missouri Heli Bug project and was not performed.

B. Effects Common to All Alternatives

There are several common, or typical effects, that would occur with any action alternative and are discussed below. Many of these effects are related to the watershed restoration activities such as removal of encroaching roads. In the discussion, the effects of not removing the encroaching road (or other action) also is discussed.

Effects of Encroaching Roads

As described in the Existing Conditions discussion (Stream Channel Stability), roads which encroach into stream channels or flood-prone areas are common in Beaver Creek. No activities are proposed under any alternative to address encroaching roads, although the ongoing and reasonably foreseeable activities (described in Chapter II) include activities that will address this issue. Therefore, the following effects would occur under any alternative.

Effect on stream condition: Encroaching roads occupy the active flood prone area associated with the stream, or the active channel itself with road fill. Those road sections reduce capacity of the stream at flood stages, alter flow patterns, increase local velocities, redistribute sediment loads, and compromise the function of the stream's riparian areas. During flood flows, the depth of flow is increased, and normal flow patterns are disrupted. This often causes scouring of opposing stream banks and undercuts opposing hillslopes, which in turn is an erosion source that increases sediment input into the stream. Sometimes the scour undercuts the opposing slope which destabilizes it and initiates a mass failure (such as a slump or debris avalanche) of material into the stream. In some cases, the road constricts the channel enough that the natural meanders are straightened and stream slope is steepened. This can result in rapid adjustments by the stream to regain its balance with the water flow and sediment load. The result is an unstable stream which will compromise the support of beneficial uses.

Effect on sediment: Roads located close to streams usually deliver more sediment to streams than other roads for two reasons: 1) roads in close proximity to streams are more likely to be subject to the erosive forces of running water; and 2) eroded materials do not have to travel far to be delivered to the streams. The closer a road is to the stream, the smaller the expanse of forest floor and its rough materials available to capture and store sediment.

Effect of Encroaching Road Removal: Removal of encroaching roads would reduce sediment delivery in the short and long-term. Improvement in stream condition and habitat in terms of clarity, accumulation of sediment, loss of cover, erosive velocities, etc., would occur at the road removal site and immediately downstream. During and after road removal, some fine sediment would likely be delivered to the water. The majority of sediment delivered to the stream would be in the form of suspended sediment. The suspended sediment would route through the stream system quickly and the primary effect would be turbidity (loss of clarity of the water). The increase in turbidity would be measurable for a short time immediately following disturbance and would be evident for short distances downstream from the fill removed (generally less than 1,000 feet). The amount of sediment from road fill removal would be low, especially when compared to the long-term reduction that would result. Standard Best Management Practices (including silt fences, mulch, and coffer structures to de-water the work site) as well as other erosion control techniques would minimize the amount of sediment delivered in the short-term. The re-establishment of effective vegetation would essentially eliminate long-term sediment inputs.

Tree Mortality and its Effect on Stream Temperature

At the tributary scale, stream temperature would not be expected to change in most watersheds under any alternative including the No-Action Alternative. No harvest would occur where shade or cover to the stream would be affected under any action alternative. Some trees that are currently providing shade to streams have already died or may die soon as a result of the Douglas-fir beetle attack and root disease. The loss of shade from this mortality would not be expected to increase water temperatures locally or downstream due to one or more of the following: high mixing capacity of most mountain streams, inflow of subsurface water, and/or the low amount mortality of shade trees in riparian areas.

Effect of Stream Crossing Failures

No activities are proposed under any alternative to address stream crossings, although the ongoing and reasonably foreseeable activities (described in Chapter II) include activities that will address this issue. Therefore, the following effects would occur under any alternative.

Effects on abandoned or unmaintained roads: Extensive road networks were constructed in the 1960's throughout the analysis area. Typically these older roads were designed for a useful life of 20 years, including the crossing structures. The majorities of these roads presently are stabilized with vegetation, and are not actively delivering sediment to stream channels. Although often brushed in, many of these roads still have culverts and fills at stream crossings. Abandoned and unmaintained roads, including stream crossings, can be expected to fail over time.

These failures are usually associated with relatively infrequent hydrologic and climatic events. A typical example is when warm, moisture-laden air masses move into the region over a watershed that is dominated by a ripe snowpack (near freezing temperature and loaded with water) that is ready to melt. The results are often a rapid and flashy runoff that is referred to as a "rain-on-snow" flood. During these events, water flow can exceed the capacity of the crossing structure (such as a culvert pipe or bridge), or debris blocks the inlet. The water rises and overtops the fill, eroding it (often en masse), and depositing the material into the creek. In some locations, pore water pressure in the soil actually destabilizes the fill material and the hillslope, causing them to slump into the creek.

Effects of sustained grade roads: Stream crossings on steep sustained grades are sometimes inadvertently installed. At these crossings, the downhill approach of the road is lower than the road surface at the stream crossing. When the structure is blocked by debris or its capacity somehow is exceeded, the water overtops the pipe and begins flowing down the road. Instead of flowing directly over the road and back into the channel, it flows downslope on the road or in the ditch line until an obstruction, such as a low point in the road, forces the flow across the road surface and onto the fill. The water often erodes the road surface, causing gullies in the road tread, road fill, and the slope below the fill as the water travels back to the stream. The amount of sediment delivered to the stream from this type of erosion would exceed the amount of sediment delivered from only the stream crossing failure and would include erosion from the crossing, the ditch line, the road prism and the fill. In some cases, failure of a crossing and subsequent overflow can initiate mass failure of the hillslope above the failure.

Flow relief drivable and hardened dips can be installed at stream crossings where flows could escape as described down the road. This would reduce the amount of sediment delivered to the stream for the long term. Some sediment may be delivered to the stream during installation of the dips, but the amount would be small and not expected to reduce water quality or alter stream condition.

General Effects: The failure of large fills at stream crossings or encroaching roads inundates the stream with sediment and overwhelms its capacity to move it. The deposited materials tend to remain intact as a mass or 'slug' of sediment that can severely alter smaller streams by filling both channel and flood prone areas. The

result is a loss of channel capacity and habitat that supports beneficial uses. The sediment mass begins to disperse as it moves downstream and enters larger streams, which reduces the channel effects of the single failure. However, multiple failures in a single watershed can result in long-term adverse effects downstream.

Effects of Grazing

The effects of grazing in Beaver Creek have been documented in the Environmental Assessment for Coeur d'Alene River Grazing Allotments (2001). Grazing allotments within the project areas are identified in the Reasonably Foreseeable Activities section in Table 2-5. The Forest Service has not yet selected a management alternative, so the No-Action Alternative (which would have the most environmental impact) will be assumed. Direct effects to stream conditions in the project areas would consist of localized areas of bank trampling and erosion, primarily in the lower reaches of Beaver Creek (Draft Grazing EA 2001, pp. 66-68). Cumulative effects could include delayed vegetative recovery in portions of the riparian area, but would not affect overall stream conditions. In terms of water quality, nutrient loading and pathogens would not decrease and could inhibit support of beneficial uses including cold-water biota and salmonid spawning (Grazing EA, p. 70).

C. Effects Common to Both Action Alternatives

Effects of Increased Sediment due to Road Use

Use of roads during project activities would increase sediment delivered to streams. The heavy use of vehicles, mainly logging trucks, and frequent surface blading of the road surface would increase the amount of sediment eroded during summer rainfall events. Some of this sediment may be delivered to the stream where the road is near the stream or when runoff is carried down a ditch line. The amount of increased sediment would be expected to be immeasurable and would not reduce water quality or affect stream condition.

Sediment Delivery Due to Harvest and Yarding Activities

No sediment, would be expected to be delivered to streams from logging yarding activities because of the implementation of Best Management Practices. Yarding activities also would be located beyond the riparian areas of streams or lakes. Undisturbed lands between all logging activities and Riparian Habitat Conservation Areas (RHCAs) would trap any sediment that may reach the margins of disturbed areas (Belt, G.H., et al, 1992). All landings would be located outside of RHCAs and designed to minimize the risk of sediment delivery and to prevent mass failure potential. These mitigation measures are included in Chapter 2.

Effects to Stream Temperature as a Result of Loss of Riparian Trees

Water temperature is the principal regulator of biological activities for aquatic organisms and often the limiting factor in their survival. Direct solar radiation is the main factor that can be altered by management activities. Field reviews suggest that the number of dead and dying riparian trees is very low and that these trees are scattered throughout stream basins. There would be no harvesting of riparian trees under the Missouri Bug project. Therefore, there would be no impact on existing stream temperatures.

Direct and Indirect Effects to Local Sites and Reaches (Beaver Creek)

At the tributary scale, no direct or indirect effects to beneficial uses are anticipated from harvest activities under any of the alternatives, including the No-Action Alternative. No increase in sediment would be expected at the tributary scale with no road construction or reconstruction. The implementation of Best Management Practices (BMPs) and adherence with the Inland Native Fish Strategy would provide protection for riparian habitat.

Under Alternative 2, WATSED predicts that the green tree harvest to create conditions for regeneration treatments would result in an additional 21 scattered equivalent clearcut acres over the No Action Alternative. Under Alternative 3, this green tree harvest would result in an additional 12 equivalent clearcut acres over the No Action Alternative. These acres are scattered over the area, not localized into one harvest unit. Harvest prescriptions retaining the healthy overstory trees on site and the irregular, small, opening pattern that would be created under these prescriptions pose very little risk of increases in peak flows associated with rain on snow events.

The direct and indirect effects of canopy removal at localized sites under all alternatives within Beaver Creek would be altered snow accumulation patterns and melt rates. Some change in timing, and increases in the magnitude and quantity of flow would occur under all alternatives at individual sites. The majority of any increased flow at these localized sites would be due to the mortality of trees from the Douglas-fir beetle and root disease. No measurable increase in magnitude or quantity of flows is expected in any of the action alternatives with the additional mortality due to the harvest of scattered, generally smaller, green trees. No measurable effects are expected to occur in stream channel conditions.

Direct, Indirect, and Cumulative Effects at the Watershed Scale

The cumulative effects analysis area extends from the headwaters of Beaver Creek to its outlet into the North Fork of the Coeur d'Alene River. All cumulative effects for the watershed are estimated at the outlet of Beaver Creek. This was a logical unit for analyzing cumulative effects as well as the largest area over which effects would be measured.

At the confluence of Beaver Creek and the North Fork of the Coeur d'Alene River, no measurable changes in watershed hydrology would result from proposed management activities. Activities are situated high in the watershed away from the streams and comprise only a 0.08 percent increase in ECA's for Alternative 2 and a 0.05 percent increase in ECA's for Alternative 3 above the No-Action Alternative (See WATSED Report, Project Files). No measurable change in peak flows or flood frequency would occur.

There would be no increase in sediment yield at the confluence of Beaver Creek from management activities under either action alternative. This is due to the low level of harvest, no road construction or reconstruction, the large component of helicopter yarding, and Inland Native Fish buffers would be maintained on all streams. As a result, the WATSED model predicted no increase in sediment yield under either action alternative over what would occur under the No-Action Alternative.

Cumulatively, there would be no measurable short- or long-term effects to stream condition or hillslope hydrology. No adverse effects to beneficial uses can be expected under any of the alternatives. Risk of future sediment loading, primarily at the road channel crossings and along road sections that directly encroach on the stream channels, has been substantially and permanently reduced with past watershed improvement activities. The pollutant of concern (sediment) that has caused the Beaver Watershed to be listed as Water Quality Limited has been substantially reduced in both the short- and long-term because of reductions in stream crossings and encroaching roads.

The modeled cumulative effects analysis for Beaver Creek included activities scheduled under Alternative D of the Douglas-fir Beetle Project FEIS and the Small Sales FEIS. Alternative D under the Douglas-fir Beetle Project planned to implement 589 acres of harvest in the Beaver Creek watershed. Only 243 or 41% was implemented. That project also planned to implement 4.0 miles of road construction. Only 0.4 miles of temporary road was constructed with that project. The Small Sales FEIS planned to implement 257 acres of harvest with 0.2 miles of temporary road construction. Only 90 acres are scheduled for harvested, with no road construction, with an additional 10 acres of harvest being considered. Therefore, the risk of negative cumulative effect to beneficial uses is actually significantly lower than what was analyzed.

The wasted model for all alternatives show no increases in either peak flow or sediment for all the action alternatives, See Table 3-9. Each measure of change in the table is discussed above in the "Methodology" section.

Table 3-9. Projected watershed response in the Beaver Creek Watershed, by alternative.

Measure of Change	Alt. 1	Alt. 2	Alt. 3
Sediment yield (%)	141	141	141
Peak flow (%)	5	5	5
Net stream crossings (#)	-19	-19	-19
Net roads (miles)	-8	-8	-8
Net encroaching road (miles)	-.1	-.1	-.1

Effects of possible future projects such as Hither and Yon Beetle and the Beaver Creek EIS will be analyzed at the time of proposal. A salvage project such as Hither and Yon Beetle is expected to have minor effects on the watershed with the emphasis on the salvage of dead timber. The Beaver Creek EIS will be a landscape level project which will provide a thorough assessment of the overall watershed condition and is expected to provide greater opportunities to enhance the existing condition of the watershed.

3.4.4. Consistency With the Forest Plan and Other Applicable Regulatory Direction

Forest Plan Standards: All alternatives are consistent with Forest Plan Standards for water (IPNF Forest Plan, Chapter II, page II-33) because of 1) the low level of harvest, 2) the distance between harvest units and the stream channel, and the 3) implementation of Best Management Practices (BMP's). Models, field data, monitoring data, and professional judgment were used in the analysis to approximate the effects of activities on the water resource.

Protect water quality per the Clean Water Act and to meet or exceed States' Water Quality Standards: The Forest Service has agreements with the States to implement Best Management Practices (BMP) or Soil and Water Conservation Practices for all management activities to meet the objectives for Forest Practices. Monitoring would be designed to demonstrate the implementation of BMPs and provide feedback concerning their effectiveness in protecting water quality. Watershed conditions that contribute to water quality that is impaired would be improved through ongoing and foreseeable restoration projects. Riparian areas would be managed to meet objectives for riparian-dependent resources (fish and wildlife habitats, water quality, stream channel integrity, vegetation, public water supplies).

Inland Native Fish Strategy: The Inland Native Fish Strategy has been implemented as amendments to the Forest Plans of the Idaho Panhandle and Colville National Forests. All action alternatives would be consistent with this direction. The amendments require mitigation of environmental effects of management decisions. Specified riparian management goals and objectives have been developed, and Riparian Habitat Conservation Areas (RHCA) are defined and delineated. Riparian management and Riparian Management Objectives (RMO) are addressed using site-specific analysis and supportive data, and watershed analyses. The strategy also specifies standards and guidelines, which must be applied for certain activities in RHCAs. These are incorporated into the action alternatives as specified in Chapter II.

Clean Water Act and Water Quality Limited §303(d) Listings: Under authority of the Clean Water Act, the EPA and the States must develop plans and objectives (TMDLs) that will eventually restore listed stream segments. In lieu of those plans, Forest Service will demonstrate or find that their actions will not result in a net substantial increase in the pollutant of concern or prohibit or delay potential recovery (IDHW, 1997;

USDA Forest Service, 1995). All alternatives would be consistent with the Clean Water Act and Water Quality Limited Listings.

3.5. FISHERIES

3.5.1. Regulatory Framework

The National Forest Management Act (NFMA) (1976) requires that the Forest Service manage for a diversity of fish habitat to support viable fish populations (36 CFR 219.19). Regulations further state that the effects on these species and the reason for their choice as management indicator species be documented (36 CFR 219.19[a][1]). The 1969 National Environmental Policy Act (NEPA) required analysis of projects to insure the anticipated effects upon all resources within the project area are considered prior to project implementation (40 CFR 1502.16). Section 7 of the 1973 Endangered Species Act (ESA) includes direction that Federal agencies, in consultation with the United States 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 Forest Plan for the Idaho Panhandle National Forests (IPNF) provides management goals and objectives for the protection of the fisheries resources. The Inland Native Fish Strategy (INFS) amended the IPNF Forest Plan in August 1995 and contains additional standards and guidelines to protect the aquatic environment.

Proposed activities in the Missouri Heli Bug project area were analyzed with respect to these regulatory requirements in the Fisheries sections. Additional regulatory requirements related to fisheries resources (***e.g.*** Clean Water Act and Idaho Water Quality Standards) are addressed in the Water Resources sections.

3.5.2. Methodology

The cumulative effects area is based on the entire Beaver Creek basin. Beaver Creek is a Sixth-scale code watershed. The Hydrological Unit Code (HUC) for this watershed is number 1701030130.

A. Methodology

Methodology Used to Identify Existing Conditions

Beaver Creek is very unstable and highly erosive system, and contributes visible quantities of sediment to the North Fork of the Coeur d'Alene during high flow events. Flood events in 1964, 1974, and 1996 have affected channel stability in the lower to middle reach of the Beaver Creek. Instream sediments are high due to past road and culvert failures, peak flow increases, and road constriction of the channels. Beaver Creek has also been significantly impacted by past mining activities with direct impacts to the channel and with the presence of heavy metals. Over 85 percent of Beaver Creek flood plain is in private ownership. Past and current management on private lands include cattle grazing, mining, timber harvest, agricultural clearing, and clearing for home sites. Management activities on public land include timber harvest, grazing, and mining. Stream conditions in this area are degraded as a result of local and upstream impacts and from loss of riparian vegetation on private ownership.

Within Beaver Creek, the predominant fish habitat on public lands is made up of the B and C channel types within the tributaries. These include Alder Creek, Deer Creek, Dudley Creek, Moore Gulch, White Creek, Pony Gulch and Scott Gulch. Most of Missouri Gulch is too steep a gradient to be a fisheries stream. Fish habitat surveys were conducted on Alder and White Creeks, tributaries of Beaver Creek, in 1993. Surveys showed considerable variation by reach, or segment of the tributary. Some sections were seriously degraded, other sections in fair condition. Pool length varied from 0 to 50 percent of the channel depending on the reach. However, pools were generally found to be shallow and of low volume. Most pools were found to be associated with large woody debris with low to moderate cover. Most of the cover was associated with the woody debris or terrestrial vegetation (Project Files – Fish). Watershed restoration surveys in Alder and White Creeks in 1998 founds these streams to be degraded, but stabilizing due to adequate large woody debris, and generally of poor fish habitat. Other tributaries in the Beaver Creek drainage are expected to be in a similar degraded condition.

Fish surveys were conducted in Alder Creek in 1985 as part of the Taft-Bell Fishery Monitoring Project. Cutthroat trout and brook trout were found to be present but numbers were quite low (Project Files – Fish).

Existing conditions were established for primary habitat components believed to be influencing the productive potential of the Management Indicator fish species within the analysis area. Changes to these habitat components by the action alternatives are addressed by measuring changes in physical structures that affect the habitat components important to fish and are effected by management actions. Habitat components of interest include stream temperature, aquatic habitat diversity, cover complexity, and channel stability.

- ***Stream temperature*** is one indicator of aquatic habitat conditions for this project area (Hicks et al. 1991). Stream temperature information collected during stream surveys is evaluated in relation to Idaho State Water Quality Standards for designated beneficial uses. The direct removal of riparian vegetation through road construction and timber harvest can indirectly change stream temperature by increasing sunlight to the water. If this increases outside the range that cutthroat trout evolved, detrimental effects may occur (6-17 C; Bjornn and Reiser 1991). Because of the low water temperature requirements of bull trout any increase in stream temperature would likely have a negative effect on this species.

- ***Habitat diversity*** (composition and quality) is another indicator of aquatic habitat conditions and is assessed as to the quantity and degree of development of various types of aquatic habitat (*e.g.* pools, riffles, etc.). Stream segments possessing numerous habitats with a wide variety of stream velocities, water depths, and physical habitat configurations are considered more diverse and have a greater potential for meeting the habitat requirements of naturally reproducing trout populations. Removal of riparian vegetation, which reduces instream wood, along with increases in bedload and sediment, and changes in stream morphology can affect the composition and quality of habitat.

- ***Cover complexity*** is also an indicator of habitat conditions and is evaluated by the degree of habitat partitioning by various structural elements such as large woody debris, boulders, and undercut banks. This physical separation within habitat units can help maximize fish production by decreasing competition and aggression, reducing predation, increasing carrying capacity, and producing microhabitat conditions that minimize energy requirements and provide refugia for fish inhabitants. The same information used to reflect changes in habitat diversity are used to display changes to cover complexity, particularly instream wood and channel morphology.

- ***Channel stability*** is another indicator for fish habitat conditions because it influences the quality of pool habitat as well as helps to establish the trend for aquatic habitat conditions. Channel stability is discussed in the "Watershed" section of this EA and incorporated into the assessment of fisheries resources. The relationship between upslope processes and stream channel condition were also assessed by incorporating the analysis of the hydrologic condition within the project area. Changes to

channel stability are highly dependent upon changes in water yield and timing, and bedload movement. Other selected features that are believed to influence the condition of riparian areas, and subsequently fish habitat are also discussed.

Because of the difficulty of directly measuring stream habitat components as well as delay between land management actions and altered stream conditions, this EA tracks management actions that could alter stream conditions. The relationship between the habitat component and the measurement of change is discussed below.

- ***Riparian Harvest:*** For this EA the amount of riparian harvest is a measurement for changes in stream temperature, habitat diversity, cover complexity, and channel stability. The direct effect of riparian harvest is the reduction of shade and large wood component near streams. The indirect effect of reducing the amount of streamside vegetation include altering timing and amount of sediment delivery, wood loading in stream, stream temperature, and the hydrologic regime (Meehan et al. 1991). The cumulative effects of riparian harvest can be reduced egg-to-fry survival (by increased fines in reeds) and reduced adult survival (by increasing temperature outside of tolerated range and/or by altering carrying capacity by reducing highly utilized habitat) of Management Indicator species. For purposes of consistency in this analysis, an average distance of 300 feet from fish-bearing streams will be considered as riparian habitat. Although not all the vegetation within this 300-foot buffer will consist of vegetation that is dependent on the water table, it does provide conditions necessary to maintain these types of vegetation (FEMAT, 1993). In addition, riparian harvest within 75 feet of intermittent streams will be considered riparian harvest. By maintaining riparian habitat, the Forest will trend toward meeting the large woody debris Riparian Management Objective of the Inland Native Fish Strategy.

- ***Sediment Delivery Risk***: The risk of sediment delivery will be tracked by risk of failure at crossings and temporary/permanent road constructions. A majority of these risks are located where roads cross streams. The direct effect of sediment delivery at roads can be reduced passage of fish. The indirect effects of these failures include increased fine sediment in redds, and channel simplification due to torrents. The cumulative effects of additional sediment delivery can be reduced egg-to-fry survival (by increased fines in redds) and reduced adult survival (by altering carrying capacity by reducing highly utilized habitat such as pools) of Management Indicator Species. The cumulative effects related to road failures can ultimately lead to a decline in fish number (Furniss et al. 1991). Reducing the amounts sediment entering streams will result in a trend toward the Pool Frequency and the Width/Depth Riparian Management Objectives.

- ***Increased Fish Passage:*** The placement of culverts at road crossings alters the ability of fish to utilize stream habitat above the culvert. The direct effects of modifying these culverts is increased fish passage. The indirect effects of fish passage is the movement of fish to portions of streams not previously used but also replacement activities may increase short-term sediment production. The cumulative effects of increased passage is the increased probability of persistence of the Management Indicator Species. Passage for this analysis will be focused on spring migration of adult westslope cutthroat and summer/fall migration of bull trout.

- ***Reduced Length of Encroaching Roads:*** The fourth of these measures of change will be the amount of encroaching roads removed as a result of restoration activities. Direct effects of reducing the length of encroaching roads is reduced flow velocity. Indirect effects are an increase in habitat complexity and fish carrying capacity. Cumulative effects are increased numbers of fish. Because valley bottom roads pose a significant risk for fish (Dose and Roper 1994, Hick et al. 1991), reducing these roads is extremely important to maintaining the long-term viability of fish species (including the Management Indicator Species), as well as maintaining terrestial species within the basin that rely on

riparian habitat. By reducing the amounts of encroaching road the result will be trending towards the Pool Frequency and the Width/Depth Riparian Management Objectives.

3.5.3. Existing Conditions

The cumulative effects area is based on the entire Beaver Creek basin. This basin includes Rock Gulch, Missouri Gulch, Scott Creek, White Creek, Alder Creek, Kid Gulch, Moore Gulch, Dudley Creek, Carbon Creek, Unknown Gulch, Pony Gulch, Cleveland, Trail Creek, and Potosi Gulch. Under the Capitol Hill and Kings Ridge Timber sale projects, within the Beaver Creek drainage, 19 miles of hillslope and riparian roads have been obliterated along with the removal of 40 stream crossings. Upgrades of channel crossings and undersized culverts to meet Q100 year flood events have been completed within the Capitol Hill planning area on existing system roads in the area.

A. Fish Presence

The cumulative effects area contain approximately **28** miles of fish-bearing stream segments. Fish species that may inhabit streams in this area include native populations of westslope cutthroat (*Oncorhynchus clarki*), bull trout (*Salvelinus confluentus*), mountain whitefish (*Prosopium williamsoni*), northern pike minnow (*Ptychocheilus oregonensis*) (formerly squawfish), large-scale sucker (*Catostomus macrocheilus*), torrent sculpin (*Cottus rhotheus*.) shorthead sculpin (*Cottus confusus*), and possibly longnose dace (*Rhinichthys cataractae*) and redside shiner (*Richardsonius balteatus*). Introduced fish species include populations of rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) (Data on file at the Coeur d'Alene River District, Simpson and Wallace 1978). Fish that are the product of hybridization between native cutthroat trout and exotic rainbow trout and between native bull trout and exotic brook trout may be present. The distribution of some of these fish within streams in the cumulative effects area can be found in the table below.

The current condition and distribution of the fisheries resources within the area analyzed within this EA were established by utilizing the best available information including interpretation of information from stream inventories, field reviews, historical records, aerial photographs, analysis of watershed conditions, published scientific literature, discussions with Fisheries Biologists from the Idaho Department of Fish and Game, the United States Fish and Wildlife Service (USFWS), and the Idaho Division of Environmental Quality (DEQ), and comprehensive knowledge of the fisheries resources in the Coeur d' Alene basin. The distribution of selected fish species within the Beaver Creek watershed can be found in the following table.

Codes for species: *WCT - westslope cutthroat trout, BT - bull trout, RT - rainbow trout, _ BkT - brook trout, MW - mountain whitefish, Scp - Sculpin*

Codes for access: *Y=access present, no known migration barriers; N=human-caused migration barrier within the stream; N*=natural migration barrier within stream.*

Codes for species present: *- Y - Surveyed and present, LY - Unsurveyed but likely present, N - Surveyed but not found, N* - Natural barrier, LN - Unsurveyed but unlikely present, H - Documented historic, now unlikely, LH - Likely historic, now unlikely.*

Table 3-10. Summary of the distribution of selected fish species within the Beaver Creek watershed.

Stream Name	HUC #	Access	WCT	BT	RT	BkT	MW	Scp
Beaver Creek	1701030130	Y	Y	H	LY	Y	LH	Y

Due to the large number of fish species within the cumulative effects area, analysis of direct, indirect, and cumulative effects to fish uses 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 use of Management Indicator Species within the area affected by this EA is simple since historically the area was dominated by cold water biota and these species are sensitive to the types of land management action proposed under most alternatives (Meehan 1991). The Forest Plan identifies westslope cutthroat trout and bull trout as potential Management Indicator fish species for the effects of management actions on fisheries and they are used for that purpose in this document. The life histories of one additional species listed on the Regional Foresters sensitive species list, the torrent sculpin, are included below. Since torrent sculpin is also a cold water species, the effects of this action to these species would be similar, where these species occur in the watershed analysis area, and is covered under the effects to the Management Indicator Species. Two other sensitive species, the burbot and redband cutthroat, will not be addressed in the EA because they are known not to occur in the Coeur d'Alene Watershed (Simpson and Wallace 1978).

Fish populations in the analysis area consist predominately of Westslope cutthroat trout (*Onchorhynchus clarki lewisi*). Westslope cutthroat trout are known to be utilizing streams within the analysis area for migration, spawning, rearing, and possibly over-wintering. Bull trout (*Salvenlinus confluentus*) have been found in the Coeur d'Alene River and Lake (IDF&G, 1989) but more recent surveys (Dunnigan, personal communication) show no indication of their presence in the analysis area. Individual fish, however, have been reported within the mainstem Coeur d' Alene River, Prichard Creek and the Little North Fork Coeur d' Alene River. Westslope cutthroat trout and bull trout have been selected as appropriate Management Indicator Species for the fisheries analysis of the Missouri Bug project. These species are indicators for all the cold water biota within the stream segment (Meehan 1991).

Westslope Cutthroat Trout

Westslope cutthroat trout are listed as "Sensitive" by Region 1 of the USDA Forest Service and also 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) (3/2/98 letter, FWS 1-9-99-SP-158). This species is currently under review for listing under the Endangered Species Act.

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

Resident, fluvial, and possibly adfluvial life history strategies of westslope cutthroat trout are likely present within the watershed in the analysis area. Resident populations remain in river tributaries throughout their life. Migratory populations (fluvial and adfluvial fish) use river tributaries for early rearing and spring spawning as adults, but typically 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 analysis area are utilized by westslope cutthroat trout representing all life history strategies during various phases of their life cycle.

A population status review of the 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 the original Idaho range. The primary cause of the decline was found to be habitat degradation (Rieman and Apperson 1989).

Bull Trout

Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics including water temperature, stream size, substrate composition, cover and hydraulic complexity have been associated with the distribution and abundance (Jakober 1995; Dambacher and others, 1994; Rieman and McIntyre 1993).

Stream temperature and substrate composition are important characteristics of suitable bull trout habitats. Bull trout have repeatedly been associated with the coldest stream reaches within basins.

In a status review of bull trout on the Idaho Panhandle National Forests, stocks from the Coeur d' Alene watershed were considered to be at high risk of extinction (Cross 1992). Genetic analysis has shown bull trout within many sub-basins of Northern Idaho may be unique stocks (B. Rieman, Rocky Mountain Research Station, personal communication), but are closely linked to the upper Columbia River group - one of three major groupings of bull trout throughout the Columbia and Klamath River drainages (Williams, 1997). Bull trout have recently (within the last 10 years) been documented or observed in the main Coeur d' Alene river. No individuals are known to spawn within the Coeur d'Alene basin.

It is likely that Bull Trout were historically present in the Beaver Creek watershed. However, Beaver Creek is not thought to be one of the more cold water reaches in the basin, which is preferred by Bull Trout. Management for Westslope Cutthroat trout would provide similar habitats that would favor the possibility of Bull Trout re-establishment.

Torrent Sculpin

Torrent sculpin were added to the Idaho Panhandle's sensitive species list March 12, 1999 (CITATION?). This species has been found within the mainstem Coeur d'Alene River and larger tributary streams. Their preferred habitat is riffle habitat in medium to wide streams and rivers (Markle et al. 1996). Large adults (>150 mm), however are found in pools. Spawning usually occurs in May and June and occurs in riffles with moderate to swift flows. The range of torrent sculpin overlaps with both westslope cutthroat and historic bull trout and are also a cold water species. This species is assumed present in all larger streams. The middle and lower reaches of Beaver Creek would be considered a large enough stream for torrent sculpin to be present. The possible effects on this species is covered by analyzing the effects on the cold water Management Indicator Species.

B. Habitat Connectivity

Environmental conditions in the planning area have been influenced by natural events and processes as well as human activities. Effects of natural disturbances such as volcanic eruptions (such as Mt. St. Helens, Mt. Mazama), historic fires, landslides, and flooding have interacted with other land-evolving processes (for example, geologic up-lift and stream channel down-cutting) to form the basic character of watersheds and the dependent stream resources. Due to variability in the location, frequency, intensity, and ultimately, the effects of natural processes on the physical environment, dynamic landscapes with diverse conditions are formed at various spatial scales. Biological communities including native fish populations led to development of

functional ecosystems that are inherently resilient to effects from natural disturbance regimes representing pulse-type disturbance (Reeves *et al.* 1995). Pulse disturbances influence the natural range of environmental conditions that are expected for ecosystems functioning at broad geographic scales but typically allow systems to begin recovering to pre-disturbance conditions after the disturbance.

Natural disturbance regimes and their associated properties (sedimentation rates and other influences on aquatic habitat) have been altered in the cumulative effects area by human activity. Land use activities that have modified natural disturbance characteristics include railroads, roads, flumes/chutes, settlements/towns, grazing, mining, stream modifications (constriction, channelization, diversion, dams, culverts, and cleaning - removal of woody debris), logging, and fire suppression. Many of these human influences are considered press-type disturbance that continue to affect the condition and trend for fisheries resources long after the initial disturbance. Press disturbance differs from pulse disturbance in several aspects but generally press disturbance is persistent in ecosystems and impairs the ability for ecosystems to recover to pre-disturbance conditions (Reeves *et al.* 1995). Within the cumulative effects area, the recovery process from pulse disturbance has been hindered by the presence of various press disturbances. The following discussion relates these findings to the existing condition of fish habitat.

In general, watersheds within Northern Idaho can be described by one of four disturbance regimes: Unburned Watersheds Without Management Activities, Unburned Watersheds With Management Activities, Burned Watersheds Without Management Activities, and Burned Watersheds With Management Activities. A description of those disturbance regimes and the watersheds that can be described by that regime can be found in the Douglas-fir Beetle EIS (IPNF 1999). The Beaver Creek watershed would be within the Unburned Watershed With Management Activities category. The general conditions are described in the following paragraph.

Watersheds not burned since the early 1900's, have experienced more recent disturbances associated with land management. Various intensities of road activity (*e.g.* construction, reconstruction, and maintenance), timber harvest, mining, and/or recreational facilities have influenced the rate of fish habitat recovery from historical disturbances in several streams. The existing transportation system in the cumulative effects area is an extension of historic road locations that paralleled stream courses from the valley bottoms to the mountain ridges in many cases. Riparian roads in the cumulative effects area have high levels of erosion during flood events, accelerate stream sedimentation rates, reduce channel stability, inhibit flood plain functions, reduce large woody debris recruitment potential, reduce stream shade, and otherwise impair the development and maintenance of quality fish habitat. Existing fish habitat conditions are generally below desired levels and the trend is generally not favorable in all these subwatersheds within this category.

C. General Effects of Land Management Activities

Newer roads within the planning area have been constructed in more stable locations higher on the hillslopes and are of less concern for fisheries resources (please refer to the "Watershed" discussions). However, roads on hill slope locations can contribute to impaired fish habitat conditions. These roads can elevate stream sedimentation by increasing surface erosion potential and mass erosion potential. Fill failures from sections of riparian roads can be a major contributor to stream sedimentation and considerably alter the condition and trend for fish habitat.

Recent (past ten years) timber harvest units, mining, and recreational facilities have generally had a less dramatic effect on fisheries resources than historical fires, historical salvage operations, and the existing transportation system (Furniss et al. 1991). Recent timber harvests (within the past ten years) and associated roads have contributed to cumulative effects that are affecting recovery of fish habitat conditions in these streams.

The quality of fish habitat conditions in the cumulative effects area have generally been compromised but are adequate to support viable populations of some cold-water biota, especially resident fishes. Diverse conditions of the habitat components (stream temperatures, aquatic habitat diversity, cover complexity, and channel stability) that are primarily responsible for regulating populations of native salmonids in the cumulative effects area have enabled these populations to persist albeit at suppressed levels. Analysis of existing conditions indicates that many streams in the cumulative effects area continue to recover from the residual effects from historic pulse-type (such as fires) disturbance acting in isolation or in combination with effects from on-going press-type (timber harvest, road building, management within private property.) disturbances (Chamberlin et al 1991).

One possible effect of land management on Management Indicator fish species that is not addressed in the fisheries section is changes in peak flow. In as much as large-scale fires in Northern Idaho resulted in the historic condition of this basin often having more openings than the current condition (IPNF Monitoring Plan 1998) it is unlikely any changes in peak flows resulting from management activities would have a direct, indirect, or cumulative effect outside the conditions in which these fish evolved. In addition, Jones and Grant (1996) state the natural range of variability of peak flow varies by an order of magnitude whereas the increase associated with human activities are no more than 50%. This once again suggests that fish have evolved to live through variable flows. The conditions fish have not evolved with, however, is aquatic habitat that has been greatly simplified as the result of habitat modification; these are covered in environmental consequences.

Because most of the analysis area is in a watershed that have been negatively affected by human management the goal for future management is to restore processes that form stream habitat. The easiest way to achieve this goal is to reduce the effects of roads while maintaining or improving riparian habitat conditions. While the minimum requirement for this project is to maintain fish habitat (USDA Forest Service, Inland Native Fish Strategy, 1995) the fisheries resource will be served by improving stream habitat conditions.

3.5.4. Environmental Consequences

A. Effects of Ongoing and Reasonably Foreseeable Activities

Some activities, in the addition to the activities described in the EA are common to all alternatives and are described under “Resonable Foreseeable Activities” (Chapter II). All future decisions associated with those projects identified as Reasonable Foreseeable have or will need to complete consultation with the U.S. Fish and Wildlife Service prior to the decision. Each of these activities has the potential to alter various aspects of watershed conditions. Protective measures were recommended and incorporated into the designs for most of these projects allowing watershed resources to be maintained. Effects to fisheries resources could be expected from some of these activities, and any action alternative under this analysis is considered to have additive effects when combined with the No-Action Alternative.

B. Direct, Indirect, and Cumulative Effects of All Alternatives

Riparian Harvest: Loss of riparian habitat does not benefit the Management Indicator Species. This loss of riparian vegetation is the direct result of road construction across or within Riparian Habitat Conservation Areas (RHCA's) or from harvest units within RHCA’s. No road construction or timber harvest units would occur within RHCA's as a result of the action alternatives. There will be no loss of riparian habitat as a result of ongoing and foreseeable actions common to all alternatives. All action alternatives would remove no additional riparian vegetation as there are no new stream crossings or riparian harvest. No change in stream temperature within fisheries reaches would be realized in any action alternative.

In addition to removing shade, the removal of riparian habitat could reduce the amount of large woody debris that is eventually incorporated into the stream. The direct effect of this is less wood in the channel. There

would be no direct effects in any action alternative from the loss of wood debris recruitment. The indirect effect of this loss could be a slight reduction in pool habitat, increased channel gradient and stream velocity. No indirect effects would occur under any of the action alternatives. The cumulative effect of this would be limited to reducing fish numbers in small downstream reaches proximate to the removal of the riparian habitat. Since no riparian habitat or riparian road construction would occur under the Missouri Bug project, none of the action alternatives would result in any cumulative effect to Management Indicator species from the loss of riparian habitat within the Beaver Creek drainage.

Sediment Delivery Risk: . The short term effects are related to the number of new culverts crossing streams and the length of the new roads. There would be no new road construction or stream crossings under any action alternative. There would be no increase in sediment risk in the watershed as a result of any action alternative. As a result of ongoing and foreseeable activities, there would be a small risk reduction in sediment delivery. This is associated with the 19 stream channel crossings scheduled to be restored under the Kings Ridge KV plan. There would be no additional cumulative effect to the Management Indicator Species within any of the action alternatives since there is no stream channel crossing construction or removal scheduled. With the foreseeable removal of stream channel crossings under ongoing and foreseeable actions, there would be a short-term increase in sediment in the watershed, with a long term reduction in sediment delivery risk.

Increased Fish Passage: Alternatives that remove barriers to fish passage would be a benefit to the Management Indicator species. The removal of barriers through culvert removals and upgrades allows the fish to utilize more habitat than is present under the existing conditions and may lead to more genetic diversity by reconnecting isolated stocks of fish. There would be no increase or decrease in fish passage as a result of either action alternatives or ongoing and foreseeable activities. The Missouri Heli Bug project would have no additional cumulative negative or positive effects to the Management Indicator Species within this watershed in terms of increased fish passage.

Reduced Length of Encroaching Roads: Alternatives that reduce the length of encroaching roads would have a short-term increase in sediment but would result in the long-term benefit to Management Indicator Species.

There would be 8.0 miles of road removed under ongoing and foreseeable actions not associated with this project. Approximately 0.1 miles of this is encroaching on a stream channel. In the short term, there would be an increase in fine sediment and reduction in cover where the road prism is currently in contact with the stream. Reduction of this encroachment in the long term, would allow the stream courses to settle into a regime where the stream course would be able to interact with the flood plain. Large wood recruitment would improve over time as these areas regenerate to forest and provide fallen trees into the stream and riparian areas. Habitat complexity would increase and provide more pool and hiding/resting habitat for fish. The short-term increase in sediment delivery in combination with the long-term benefit associated with the removal of the encroaching roads would still result in a positve benefit to Management Indicator species within the Beaver Creek Drainage over the long-term.

C. Cumulative Effects on Westslope Cutthroat Trout and Bull Trout Individuals and Populations

Alternative 1

Historically, the Beaver Creek watershed had abundant populations of cutthroat trout. Historic populations of bull trout occurred as well. The population trend of cutthroat trout has been on the decline in this watershed. Bull trout is non-existent.

The effect of the no action alternative would result in slightly improved changes in the current condition or trend in the Management Indicator Species due to culvert removal, reduction in miles of encroaching roads, and stream channel restoration work scheduled under the Kings Ridge and Unknown Pony project. Other reasonably foreseeable activities would have minimal effect on fish habitat in the Beaver Creek drainage.

Alternatives 2 and 3

The proposed vegetative treatment areas are generally located in the headwaters of tributaries to Beaver Creek. Much of the timber being removed is dead or dying. Helicopter yarding is being used to remove the majority of the timber. No new road construction will occur. Alternative 2 would remove some green canopy component in a irregular shelterwood method. Alternative 3 would remove a smaller component of green timber within group shelterwoods. There would be no change in population conditions at the scale of a stream segment as a result of either alternative. Because the actions have minimal effects at the scale of a stream reach, this project would have no incremental effect at the scale of the watershed.

Although there would be no cumulative effects from this project at the watershed scale, the overall effects of this project in combination with the past, present and reasonably foreseeable actions would be to maintain the rate at which the Management Indicator Species recover within the analysis area.

Effects of Reasonably Foreseeable and Ongoing Activities

Under the sale area improvement plan for Kings Ridge and Unknown Pony there is currently over 8 miles of roadway scheduled for decompaction or obliteration and 19 channel sites to be removed. Over one mile of this obliteration is on roadways within RHCA's. Fish habitat improvements are also scheduled within the area. These will include fish cover structures, step downs, riparian planting, and erosion control. These above mentioned activities will have a short term sediment increase and some loss of vegetative cover associated with removal of riparian encroaching roads, however there will be a long term positive net benefit to fish habitat within the Beaver Creek drainage. This net benefit of improved pools ratios, restoration of the flood plain, and improved rearing habitat is expected to increase fish populations within the drainage and downstream from the drainage.

The timber harvest associated with the Beaver Heli Bug and Small Sales EIS projects are generally located high on the hillsides away from riparian areas. A portion of the volume is to be helicopter logged and no new system road construction would occur. Most of the timber being harvested under the treatments is dead. The activities proposed under these projects within the Beaver Creek drainage will not produce negative effects on fish habitat. Planned timber harvest on private ownership in the headwaters of Beaver Creek, based on the type of treatments proposed, is minor in nature and is not expected to have negative effects on the fisheries population.

The Beaver Creek grazing allotment may produce minor sedimentation from stream bank erosion, where cows cross the creek, but this is very minor in nature especially with the limited number of cows using the allotment. The preferred fuelwood gathering planned for some of the roads in this area is not expected to have any effect on fish habitat as harvest is an individual tree selection of dead trees along roads that are up out of riparian areas. The firewood permit also prohibits the cutting to trees within RHCA's.

Effects of possible future projects such as Hither and Yon Beetle and the Beaver Creek EIS will be analyzed at the time of proposal. A salvage project such as Hither and Yon Beetle is expected to have minor effects on fisheries with the emphasis on the salvage of dead timber, much of it to be helicopter yarded without the need for road construction. The Beaver Creek EIS will be a landscape level project which will provide a through assessment of the overall watershed condition and is expected to provide opportunities to enhance the existing condition of the watershed and the fisheries resource.

Effects of Opportunities

The obliteration of approximately one half a mile of old mining road, if implemented could result in a short term increase in sediment, however in the long term would be a benefit to the Management Indicator Species. Treatment of noxious weeds would have no effect on the Management Indicator Species as treatments would follow standards that minimize risk to riparian vegetation and aquatic species.

D. Determination of Effects to Management Indicator and Sensitive Species

The table is provided to portray cumulative effects of the ongoing and proposed activities on management indicator fish species (including the reasonably foreseeable activities described in Chapter 2), and are designed to show the trend that would be attained with each of the alternatives. These calls integrate the preceding evaluations of habitat components and the foreseeable actions described above, and indicate the composite rating of the cumulative effects of the all actions in an alternative on the Management Indicator Species and summarized by the cumulative watershed effects areas.

Definitions

NI - No impact means that there would likely be no net positive or negative effect to the population within the cumulative watershed effects areas. No change in riparian or stream conditions.

MI - May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species indicates the action taken within the watershed is limited in nature but would result in a net benefit to individuals when compared to the existing condition, or indicates the action taken within the watershed is limited in nature but would result in a net harm to individuals when compared to the existing condition. Actions that result in the reduction of risk to individuals include isolated culvert upgrades and small scale reduction of encroaching roads with little increased risk associated with road building or riparian harvest. A change in stream and riparian conditions so that Riparian Management Objectives are trended towards at the segment or reach scale. Actions that result in the increased of risk to individual include road building or harvesting riparian areas without a widespread effort to upgrade culverts and reduction of encroaching roads. A change in stream and riparian conditions so that Riparian Management Objectives are trended away from at the segment or reach scale.

LI – Likely to impact individuals or habitat with a consequence that the action may contribute toward federal listing or result in reduced viability for the population or species indicates the actions is broad enough in scope to effect individuals throughout the basin thereby improving the condition of the population within the cumulative watershed effects area when compared to the existing conditions or indicates the action taken within the watershed is widespread and would result in a net harm to individuals when compared to the existing condition.. Actions that result in the reduction of risk to populations include widespread culvert upgrades, large-scale reduction of encroaching roads, and/or increased fish passage without increased risk associated with road building or riparian harvest. A significant change in stream and riparian conditions so that Riparian Management Objectives are trended towards at the subwatershed scale. Actions that result in the increased of risk to populations include widespread road building without a widespread effort to upgrade culverts and the reduction of encroaching roads.

BI - Beneficial indicates the action could affect individuals, but will be beneficial in the long term to individuals or populations. Actions that result in a benefit to individuals or populations include widespread culvert upgrades, large-scale reduction of encroaching roads, and/or increased fish passage without increased risk associated with road building or riparian harvest. A beneficial impact would mean a significant change in stream and riparian conditions at the subwatershed scale, trending toward Riparian Management Objectives.

Status: **NO BT** – No bull trout recently found within basin
Status: **NO WCT** – No westslope cutthroat trout recently found within basin

Table 3-11. Direct and Indirect Effects to Management Indicator and Sensitive Fish Species in the Beaver Creek Watershed under All Alternatives.

Watershed	Impact	Status	Positive Components	Negative Components
Beaver Creek	NI	No BT	No change	No change

3.5.5. Consistency with the Forest Plan and Other Applicable Regulatory Direction

Fish Standard 1: Activities on National Forest System lands will be planned and executed to maintain existing water uses. To maintain is defined as "limiting the effects from National Forest management activities to maintain at least 80 percent of fry emergence success in identified fishery streams."

Fish Standard 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.

These standards are no longer considered applicable since the Inland Native Fish Strategy was developed. The objectives for fisheries in the Forest Plan state that the forest "will be managed to maintain and improve fish habitat capacities in order to achieve cooperative goals with the State Fish and Game Department and to comply with state water quality standards. Sediment arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent fry emergence success as measured from pristine condition." (II-7). The first two standards for fish use similar language (II-29). The Fishery/Watershed Analysis to determine effects of land management activities on fry emergence is described in Appendix I (I-1, 2).

Appendix I requires that if, during the environmental assessment process, 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 Forest Plan direction, offering far more protection to inland native fish habitat. 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.

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 is has been determined to be fully consistent with the INFS Forest Plan amendment and state water quality standards for supporting beneficial uses.

Fish Standard 3: Streams listed under this standard of the Forest Plan 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. This standard does not apply under this project, since none of these low access streams are within the project area. See Forest Plan page II-30.

Fish Standard 4: Provide fish passage to suitable habitat areas by designing road crossings of streams to allow fish passage or by removing instream migration barriers. None of the alternatives would build any roads or create any new migration barriers. No migration barriers are known to exist on the proposed haul routes within National Forest jurisdiction, therefore there are no known opportunities with this project.

Fish Standard 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.

Data and inventories have been and will continue to be collected on selected streams with other projects. Fish habitat improvement projects have been implemented and will continue to be a focus item across the Coeur d'Alene River Basin. Ongoing and foreseeable activities in the Beaver Creek drainage include such projects. The Missouri Heli Bug project is not one of those proposals.

Fish Standard 6: Coordinate management activities with water resource concerns as described in Management Area 16 (riparian corridors), Appendix I, and Appendix O.

Design of the action alternative were fully coordinated with the specifications found in the Forest Plan (Appendices I and O), and standards and goals stated for Management Area 16. Class I and II streams would receive protection beyond the requirements of the Forest Practices Act under either action alternative. The action alternatives were not designed to move all streams toward meeting Riparian Management Objectives. The project was designed to avoid entry into riparian corridors.

Inland Native Fish Strategy: Specified riparian management goals and objectives have been developed, and Riparian Habitat Conservation Areas are defined and delineated. Riparian management and Riparian Management Objectives (RMO's) are addressed using site-specific analysis and supportive data and watershed analyses. Specific features (standards and guidelines) have been incorporated into the action alternatives as described in Chapter II (Features Designed to Protect Aquatic Resources). Based on the conditions and design features described, all action alternatives would be consistent with the Forest Plan as amended by the Inland Native Fish Strategy.

Under any action alternative there is proposed stand treatment which would be initiated by the harvesting of the timber resource. Standards and guidelines from Inland Native Fish Strategy were used specifically to protect water and aquatic biota within the project area. Standard widths for defining interim Riparian Habitat Conservation Areas were utilized, without site-specific modifications. The road management standards and guidelines were applied only to roads used or affected by the proposed project. The Road Management Objectives were applied only within the project area boundary, and only on those roads used for the harvesting or hauling of timber.

National Forest Management Act: The National Forest Management Act requires the Forest Service to maintain the viability and habitat for native and desirable non-native species. The environmental consequences discussion in this section of Chapter III discussed each alternative and the effects of the activities on viability of fish populations within the project area. The effects of the alternatives would be no change in habitat or populations. With the ongoing and foreseeable activities, the current conditions for species viability would be maintained or enhanced. This would occur by having no changes in stream temperature, dissolved oxygen, aquatic habitat diversity, cover complexity, and channel stability, with possible increases in habitat diversity, cover complexity, and channel stability where long-term reductions in risk would occur.

Endangered Species Act, Section 7: Within Section 7, federal agencies are required to carry out programs to conserve endangered and threatened species. Consultation is required to ensure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The effects of the alternatives would be no change to habitat or populations. With ongoing and foreseeable activities in Beaver Creek, this is likely to result in a long term reduction in risk of past management actions to populations and habitat. Documentation of these effects to Threatened and Endangered fish species is provided in the effects analysis and tables. These tables display the determination of effects. A biological assessment was prepared for all endangered and threatened species (Project Files, "Biological Assessment and Evaluations").

Recreational Fishing (Executive Order 12962, 1995): Information on the effects to fish species are discussed in the effects analysis and tables. The tables display the potential effects. The analysis discusses both habitat and populations. As populations and habitat are affected, either negatively or positively, the recreational fishing should respond similarly.

3.6. WILDLIFE

3.6.1. Regulatory Framework

The regulatory framework providing direction for the protection and management of wildlife habitat comes from the following principle sources:

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

Section 7 of the Endangered Species Act directs Federal agencies to ensure that actions authorized, funded, or carried out by them 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. Under its regulations the Forest Service is to maintain viable populations of existing and desired species, and to maintain and improve habitat of Management Indicator Species.

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 old-growth habitat, Management Indicator Species, Sensitive species, and Threatened and Endangered species.

Direction concerning implementation of the Endangered Species Act and National Forest Management Act can be found in Forest Service Manuals and various letters/memos from the Washington Office, the Regional Office and the Supervisors Office.

On January 10, 2001, former President Clinton signed an Executive Order describing the Responsibilities of Federal Agencies to Protect Migratory Birds, directing executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act. Section 3 of the Order states, "Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, within 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) that shall promote the conservation of migratory bird populations." Item e-6 directs that each agency shall "ensure that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern."

The analysis of effects to wildlife in the Missouri Heli Bug Project Area evaluated effects of the proposed activities on neotropical (migratory) birds, as disclosed in Appendix A (Issues Not Discussed in Detail in this EA). As more information and direction related to this Executive Order becomes available, the analysis and documentation related to the Missouri project will be reviewed to determine whether a correction, supplement, or revision to the EA is necessary, in compliance with Forest Service Handbook 1909.15 (Chapter 18).

3.6.2. Methodology

A. Species Relevancy Screen

Some elements of wildlife habitat require a detailed analysis and discussion to determine potential effects on a particular species. Other elements may not be impacted; be impacted at a level which does not influence use, occurrence or the decision to be made; or can be adequately addressed through design of the project. These elements do not necessarily require in-depth analysis.

The level of analysis is dependent on a number of variables, including but not limited to the existing condition, the cause and effect relationship, the magnitude or intensity of effects, the contrast in effects between alternatives, the risks to resources, and the information necessary for an informed decision. The analysis is commensurate with the importance of the impact (CEQ 1502.15), the risk associated with the project, the species involved, and the level of knowledge already in hand (USDA Forest Service, 1992, pg 1-19).

Threatened, Endangered and Sensitive species (including Proposed Sensitive species) and other Management Indicator Species that are known to occur on the IPNF were screened for their relevancy to the Missouri Heli Bug project area by reviewing sighting records, planning documents and other sources, such as scientific literature. Relevancy was determined if there is evidence of species or habitat present within the affected area, and whether any such species or habitat could potentially be affected by the proposed actions. Species relevancy for this project is specific to the Coeur d'Alene drainage and the conditions/situation which exists in the project area.

Some habitat and species may occur within the Coeur d'Alene River drainage but may not be applicable to this project area. A course filter screen was applied at the Coeur d'Alene River drainage level and then a finer filter screen was used to assess species relevancy at the project area level.

No further discussion or analysis is necessary for those species or suitable habitat that are not found within the project area. Additional rationale is provided in the project file ("Wildlife") for those species dismissed from further discussion.

Some wildlife species or their habitat are found to be present in the project area, but not measurably affected because they would not be impacted by the proposed actions, the impacts would be at a level which would not influence their use or occurrence, or their needs can be adequately addressed through the design of the project. Species determined to be not measurably affected are not discussed and analyzed. NEPA directs the agency to focus on a full and fair discussion of significant issues, and identify and eliminate from detailed study the issues which are not significant. Supporting rationale is provided in Appendix A ("Issues Not Addressed in Detail") for these species.

B. Methodology Used to Determine Reference and Existing Conditions

This section includes a brief discussion of the species habitat preferences and requirements based on scientific literature, information from the Geographic Assessment and site-specific information for the analysis area. The indicators used to display potential effects on the species are developed based on this information.

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

Capable habitat refers to the inherent potential of a site to produce essential habitat requirements of a species. The vegetation on the site may not be currently suitable for a given species because of variable stand attributes, such as inappropriate seral stage, cover type, or stand density.

Suitable habitat is that which currently has both the fixed and variable stand attributes for a given species' habitat requirements. Variable attributes change over time and may include seral stage, cover type, stand density, tree size, stand age, or stand condition.

C. Methodology Used in the Effects Analysis

The analysis considered direct, indirect, and cumulative effects. Cumulative effects are defined as impacts to the environment which result from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time. The relative scope of the cumulative effects analysis has both a temporal and a spatial component. Refer to Chapter II - for a list of foreseeable and ongoing projects.

It is the intent of this analysis that the information base reflect changes in habitat conditions (such as stand structure), resulting from past, present and reasonably foreseeable actions. Therefore, the analyses of species are a cumulative representation of these actions.

USDA Forest Service policy (Forest Service Manual 2670.32) requires a documented review or Biological Assessment of Forest Service programs or activities in sufficient detail to determine how an action may affect Threatened, Endangered, Proposed, or Sensitive species. Consultation with U.S. Fish & Wildlife Service is mandatory if the Biological Assessment concludes that a proposed action may have an effect on federally-listed species or habitat.

Indicators for Selected Species

Based on habitat relationships, appropriate indicators of habitat with a potential to be impacted by the proposed action will be measured. Those indicators are displayed in the following table. Queries of the timber stand data base (TSMRS) were developed to identify capable and suitable habitat within each wildlife analysis area. The changes in habitat for each relevant species will be disclosed and a discussion of the effects on species will be displayed. Potential effects on relevant species will be organized and displayed.

Table 3-12. Management indicators for analyzed species.

Species	Indicator
Sensitive	
Black-backed woodpeckers Fisher Northern goshawk	• changes to suitable habitat • alteration of suitable denning habitat and security • alteration of suitable nesting habitat and disturbance
Management Indicator	
Elk	• changes to potential elk use (Elk Habitat Potential)

Cumulative Effects Analysis Areas

For each species analyzed in this chapter, the cumulative effects area initially looked at the project area scale. If there were no or minimal effects to the species within the project area boundary, then there was no need to expand to a larger cumulative effects analysis level since this project would not add or subtract to the existing cumulative effect. If necessary, the cumulative effects boundaries were moved to a larger area based on the species' or guilds' relative home range size in relation to its available habitat, topographic features (watershed boundaries) which relate to how species move and utilize their home range, and boundaries that represent the furthest extent of effects. Maps depicting wildlife habitat by species are in the Project Files ("Wildlife").

Potential wildlife habitat on other ownership within the Beaver Creek drainage is generally in a modified or altered state. Though some forested habitat may be provided, it is thought to be of low quality due to past development or harvest. It is anticipated that other ownership in the area will be maintained in this modified state and will in general not provide suitable forested habitat for most T&E or sensitive species.

This analysis is tiered to the following documents, which provide the primary direction and methods used to develop the analysis for potential effects on wildlife.

- *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*
- *Toward an Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin*
- *IPNF Forest Plan*
- *Available Conservation Assessments and Strategies for wildlife species*
- *Douglas-fir Beetle Project Final EIS*
- *Additional scientific literature as appropriate*

3.6.3. Affected Environment

A. Introduction

Wildlife populations and habitats do not stay constant over time. Habitat changes result in population increases or decreases, depending on the species. Wildfires, fires set by Native Americans in the past, and insect and disease outbreaks were the primary disturbances and natural processes affecting habitats in the assessment area.

Low intensity, frequent fires maintained open understories in ponderosa pine and dryer Douglas-fir habitats. Western white pine, whitebark pine, ponderosa pine and western larch forests were more abundant than today, especially those in an old-growth condition. Historically, these trees provided important habitat for birds, bats, bears and other wildlife that use large snags and logs.

B. Old and Mature Forest

Many wildlife species occurring on the Idaho Panhandle National Forests prefer or only occur in mature and old-growth forests. Mature and old forests are more likely than younger forests to provide habitat for species which prefer large trees, structural and biological diversity, and closed canopies, and/or which depend on snags or down logs for nesting, foraging or raising their young. Existing structurally immature stands could provide old-growth habitat over time if not disturbed or if managed to maintain large, old, diseased and dead structural components of the forest within the levels needed to provide suitable habitat. Mature forest structure currently makes up approximately 23% of the stand structure within the project area (please refer to the Forest Vegetation discussion in this chapter).

Old forest structure has been reduced in amount and patch size across the Coeur d'Alene drainage. Approximately 6% of the basin is currently identified as old forest structure. Historically, there was a range of 10 to 25% old forest structure in the basin. Currently there are 75 acres within the project area designated as allocated old growth. This allocated old growth will not be entered with this proposal. The Columbia Basin Assessment lists those species considered at risk that depend on or prefer natural structural conditions associated with old and mature forests (such as open-grown ponderosa pine). Some of these include the flammulated owl, boreal owl, Vaux's swift, and Lewis' woodpecker. Most species identified as "Sensitive" by the Forest Service are associated with later successional habitats, or habitats and cover types in short supply (such as cottonwood communities, large standing dead trees or large downed trees.)

C. Dry Forest Habitats

These habitats have survived through low-intensity ground fires that occurred frequently (every 20 to 35 years). To protect human developments and future timber resources, fires have been suppressed, allowing smaller shade-tolerant trees to become established under the canopy of the dry site species. This has changed the structure of what was traditionally open-grown forest into dense, multi-canopied forests with more tree species diversity and greatly increased crown-fire hazard.

Some wildlife species prefer open, dry forests with large trees. Flammulated owls, pygmy nuthatches, white-headed woodpeckers, western bluebirds and Lewis' woodpeckers are a few examples. Forests that have developed a dense understory of grand fir or other shade-tolerant conifers are no longer suitable for these birds. Some species, including goshawk and flammulated owls, prefer gentle slopes more than steeper dry sites. No dry forest types exist within the project area.

D. Snags and Dead Down Woody Habitat

Over 40 wildlife species depend on snags (dead trees) for their forage, cover or a place to raise their young. Sensitive species that nest in snags include flammulated owls, black-backed woodpeckers and boreal owls. Black-backed woodpeckers also feed on insects in snags. Snags provide den sites for fishers and other mammals, and roosts for several species of bats and owls. Not all species of snags are used by all snag-dependent wildlife species; some tree species appear to be more important than others. Large-diameter snags provide habitat for the greatest variety of cavity users and remain standing longer than smaller snags. Ponderosa pine and larch tend to last longer than other species. Many birds that nest in snags promote forest health by controlling forest insect pests.

The amount of snags and down woody material present has been identified as a measure of forestland integrity (Quigley et. al. 1996). Many wildlife species depend on dead trees for nesting, roosting, denning, foraging, resting, or shelter. These include primary cavity nesters (woodpeckers and nuthatches), which have the ability to excavate cavities in snags; and secondary cavity users (many species of birds and mammals), which use existing cavities for nesting, denning or shelter. Providing numbers of snags that have been shown to support viable populations is a prudent approach to managing for viable/sustainable populations of woodpeckers and other species that use snags and logs. Recent studies indicate that viable woodpecker populations occurred in areas with about four snags per acre (Bull et al. 1997). Research also recommends managing snags in every 5 to 25-acre patch (Bate, 1995; Evans and Martens, 1995).

After snags fall and become logs on the forest floor, they are still important to many wildlife species. They provide travel corridors and cover for rodents and other mammals, reptiles and amphibians. Hollow logs are used as den sites by many species. Lynx, boreal toad, marten, turkey and snowshoe hare are a few of the species that favor habitats with an abundance of down logs.

In addition to snags, living trees with decay, hollow trees and broomed trees are important to many wildlife species and are an integral part of the natural processes and functions of forested ecosystems.

Timber harvesting and firewood gathering are common activities in the forest. Forest management typically selectively harvests the dying, diseased and dead trees for timber harvest, so most stands have fewer snags and dying or diseased trees after a timber sale. Snags are often felled during forest management activities because they pose a safety threat to forest workers.

Salvage logging after fires also removes snags from the landscape. Salvage logging targets recently-killed trees which have not had sufficient time to develop the decayed condition which is preferred by many snag-dependent species. Snags and down logs are used by many people who cut firewood, and corridors along open roads often have few snags. Once large snags are removed, it may be 100 years before a regenerated stand can grow new trees and produce snags large enough to meet the needs of most snag-dependent wildlife species.

Wildlife in the IPNF lived with periodic outbreaks of a variety of insects and diseases. The outbreak of Douglas-fir beetle and tree mortality provides the opportunity to recognize and retain habitat components that support a host of wildlife species. It is intuitive that species associated with old growth and snags are probably less abundant than historically. With that in mind, the beetle outbreak can be viewed as an important change that could benefit many forest wildlife species and at the same time adversely affect other habitat components for some species (e.g. percent canopy cover). Please refer to PNW-GTR-391, Bull, 1997 for more background and general management recommendations regarding snag-dependent species.

E. Security

Prior to European settlement, local inhabitants lived and traveled mainly in the major river bottomlands. Human developments and disturbance outside these bottomlands were minimal. Historically, all of the national forest was considered security for wildlife dependent upon it and animals moved freely across the landscape. Recreation, mining, and timber management have all led to an increase in the number of roads that provide access for humans and impact security for wildlife.

F. Populations

Species which are associated with mature/old forest structure, snags, or that are sensitive to human disturbance, such as many Threatened, Endangered, and Sensitive species, were likely more abundant historically across the Idaho Panhandle and the Coeur d'Alene River drainage. The gray wolf, bald eagle and Canada lynx are Threatened and Endangered wildlife species which may occur within the Coeur d'Alene River drainage. These species, except the bald eagle which is recovering, have decreased in population and distribution and occur in only portions of their former ranges on the IPNF; occurrence in the Coeur d'Alene River drainage is limited.

Human developments, habitat loss, fragmentation and disturbance have affected Threatened, Endangered and Sensitive species; hunted, trapped and wide-ranging species; and species associated with habitats outside the historical range of variability. As roads were built for mining and logging, previously secure habitats were opened to motorized traffic and other disturbances, leading to displacement of wildlife (from otherwise suitable habitat) and increased mortalities. Forest management has altered the amount and distribution of structural stages resulting in changes in the amount and distribution of suitable habitat and the populations of species which require or occur in these habitats.

Some populations are artificially controlled by humans. Idaho Fish and Game has transplanted elk, woodland caribou and mountain goats to augment low populations and increase distribution. Unlike carnivores, big-game species such as deer, elk and moose are more abundant now than historically, due in large part to continued creation of early succession foraging habitats through timber harvests, and Fish and Game's population management objectives.

3.6.4. Black-backed Woodpecker

A. Introduction

Black-backed woodpecker is a sensitive species found within insect infested forests of North America, Cascade Mountains, and northern portions of the Sierra Nevada and Rocky Mountains (Washington Department of Wildlife 1991). The black-backed woodpecker has been sighted during their breeding season in the Coeur d'Alene Mountains.

Black-backed woodpeckers have been found in Washington in scattered locations throughout the state. Heaviest concentrations seem to be east of the Cascade crest. Their distribution in Idaho is unknown. They forage for insects in the bark of live trees such as lodgepole pine and larch; however, they may prefer to forage on burned snags. They forage in various levels of the canopy, and have been seen foraging from ground level to 60 feet high or more (Jewett, et al. 1953). It is possible that species inhabit the project area. Root disease has probably resulted in endemic insect infestations that provide foraging opportunities for the black-backed woodpecker. Larch stands, which are a preferred breeding area do exist in and adjacent to the project area and will not be affected by any of the alternatives. These stands also have beetle mortality scattered through out.

B. Reference Condition

No accurate estimates or records exist for historic populations within the project area. It would be reasonable to infer the numbers of woodpeckers were greater than what occurs currently, for the following reasons. Fire likely played a significant role in providing habitat. Fires not only would have provided a food source, since it is believed black-backs prefer burned snags, but would also would have provided conditions for the establishment of seral species cover types that are preferred by the black-backed woodpecker.

C. Existing Condition

Exclusion of fire has resulted in a loss of conditions that were preferred by black-backed woodpeckers, not only in food sources but in preferred cover types as well. Changes in forest structure as a result of past logging practices have also reduced habitat components within the project area.

D. Environmental Consequences

Effects Common to Both Action Alternatives

The project includes design criteria intended to maintain a minimum number of snags distributed across the harvest units. These guidelines would retain snags in addition to the tremendous number of snags that are being created by the Douglas-fir bark beetle across the Coeur d'Alene Basin, north Idaho and northeastern Washington. Snag recruitment outside of the beetle activity area, such as from root disease and snow/ice damage, is primarily in the smaller size classes of snags, which are used more by black-backed woodpeckers than some other snag-dependent species dependent on larger snags (see pileated woodpecker and white-headed woodpecker discussions in Appendix A). For these reasons, the project would contain design criteria and mitigation measures to adequately protect and maintain appropriate habitat for black-backed woodpeckers.

Aerial detection flights in 1998 showed 2730 acres on the Coeur d'Alene River District affected by beetle mortality. Aerial detection flights in 1999 showed 63,600 acres affected. Flights in 2000 showed 62,800 acres affected by beetle mortality. Some of these acres likely overlap as they are based on locations where red trees are present. The Douglas-fir Beetle EIS has implemented salvage operations on approximately 5,000 acres. The Small Sales EIS proposes to treat about 1,100 acres. The Missouri Heli Bug project proposes to treat an

additional 40 beetle-affected acres. This salvage effort is small is scope compared to the amount of snags that are being created. This also does not take into account that some of these beetle-affected acres proposed for treatment under this proposal, may not have been included in that aerial detection flight, (ie. they are the result of year 2000 mortality after the aerial flight was made). Maintenance of snags within the project area, in addition to the many untreated beetle-affected acres, would avoid long-term impacts to the black-backed woodpecker. Please refer to the map in the Vegetation (Project Files) that shows beetle-affected and snag retention areas in the project area. There may be impacts to individual black-backed woodpeckers because harvest activities will reduce some of the habitat available for potential population increases that may occur due to the Douglas-fir beetle infestation. Under all alternatives, residual beetle-infected trees in the drainage would provide forage habitat for the black-backed woodpecker.

Direct and Indirect Effects

Alternative 1: The effects of the Douglas-fir bark beetle outbreak is an increase in feeding and nesting opportunities for the black-backed woodpecker within the project area. This created habitat is not optimal in terms of cover types and feeding sources but would be expected, and has been documented on the district, to be utilized by black-backed woodpeckers. Concentrations of dead trees would likely also be preferred as it would increase the feeding opportunities without having to fly as far from nesting areas. This species is thought to be quite timid so it is not certain how much use would potentially occur near areas of frequent motorized vehicle traffic along open roads and trails. Some of the past regeneration harvests in the project area did provide for residual snag habitats and replacement snag trees within the project area.

Alternative 2: Under Alternative 2 there would be a reduction in snag habitat with the salvage and regeneration harvest of 55 acres in the project area. Treatments would generally occur where the snag densities are the highest. The exception to this would be the 75 acre allocated old growth stand within Scott Gulch, which has heavy beetle mortality. No harvest is planned in this old growth area and it would provide a large area of dense snag habitat. Some of the treatment would occur in areas that are adjacent to open motorized routes. Treatment areas would retain 2-4 of the largest snags on the sites to maintain part of the snag habitat component created by the bark beetles. Smaller snags would also be retained to maintain the 6-12 snags per acre recommended under the Northern Region Snag Management Protocol (2000) guidelines for the habitat types that are being treated. The majority of the proposed regeneration units are designed to be group shelterwood harvests and irregular shelterwood harvests leaving most of the larger green component on site. It is believed that the group shelterwood units would still provide suitable habitat since this species does use open areas and would still have groups of green trees available for hiding cover from some predators.

The site preparation burning of these units may provide some fire-scorched trees after treatment, which may be beneficial since this species seems to key into burned timber. All trees bole-scorched during site preparation burning operations would be retained on site. Over the long-term, the regeneration of these units to pines and larch habitats would provide more habitat that is preferred for feeding and nesting than is currently available in the project area.

Alternative 3: Under this alternative there would be a reduction in snag habitat over 40 acres. Treatments would still retain 2-4 of the largest snags on site with smaller snag retention to meet the Snag Management Protocol. Some burning activity would occur under this alternative, although it would be less than alternative 2 and would be in an area less likely to create any fire-scorched mortality. Over the long-term, there would be a increase in pine and larch habitat as most of the openings created by the salvage of the beetle-killed timber would planted with long-lived seral species.

Cumulative Effects/Determination of Effects

Perhaps the greatest effect on the reduction of black-backed woodpecker habitat has been the exclusion of fire from the ecosystem with aggressive fire suppression. This has resulted in less preferred feeding sources with

patches of fire-scorched timber and with less seral species habitat which is preferred as foraging and breeding habitats. Past timber harvests in the project area have also reduced snag habitats as some regeneration units did not leave a snag component or large recruitments for future snag habitat. However, regeneration units burned in the 1990's retained fringes of burned trees as habitat for black-backed woodpeckers. Larger blocks of beetle kill adjacent to the project area, consisting of mixed stands of timber will be retained for snag habitat for species like the black-backed woodpecker.

The Douglas-fir beetle outbreak has increased the snag component in this area over the existing condition prior to the outbreak. The proposed treatments would reduce the current snag habitat but not more than the increase in snags provided by the beetle outbreak. Root disease and blister rust, widely scattered through the project area, is also providing a continual influx of snag habitat into the project area over time. Although expected to be used, snag habitat created by root disease and bark beetles is not thought to be preferred because the snags are not fire charred and root disease snags do not stand for a long period of time. However, black-backed feeding evidence has been found on beetle-infected Douglas-fir trees within the Coeur d'Alene Mountains.

Though small in scale, regeneration activities proposed under the action alternatives (alternatives 2 and 3) of this project would be expected to provide more suitable black-backed woodpecker habitat over long term with the establishment of seral species preferred by the black-backed.

Fuelwood gathering within the project area has removed a large amount of the Douglas-fir beetle mortality along the open roads. The area is in close proximity to a paved county road and further losses can be expected. Within the areas where proposed harvests would take place, wildlife trees would be marked and retained in a manner consistent with district directions in a attempt to retain structure. Other salvage operations in the Beaver Creek area, such as Beaver Heli Bug, the Small Sales EIS, and salvage on private ownership will reduce current snag levels but will not reduce levels below that which was created by the beetles. Other projects listed as ongoing and foreseeable activities in Chapter II are not expected to affect black-backed woodpeckers. A large mixed stand north of the project area (200 acres) has beetle mortality throughout and should provide adequate habitat within this area. The action alternatives may impact individuals but would not trend the species towards listing or threaten the viability of the species.

3.6.5. Fisher

A. Introduction

Fisher are medium-sized mammalian carnivores. They tend to be opportunistic predators, eating anything 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 to old-forest cover. Within the Pacific states and Rocky Mountains they appear to prefer late-successional coniferous forests in the summer and mid to late-successional forests in winter.

Fishers prefer habitats with high canopy closure (greater than 80 percent) and avoid areas with low canopy closure (less than 50 percent) (Powell, 1982). They also have been known to use riparian areas. In north-central Idaho, grand fir and spruce forests were preferred by fishers (Jones, 1991), in elevations from approximately 3,000 to 5,000 feet. The habitat requirements of fishers are thought to be 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 layers of overhead cover. Large-diameter spruce and grand-fir snags and large downed material are used for denning and foraging. Fishers tend to avoid non-forested areas. The home ranges for fishers vary with prey densities. Studies indicate that the average home range for adult males is 40 square kilometers; this is nearly three times that of females, which is 15 square kilometers.

Fishers tend to avoid human presence and generally are more common where there are fewer people and less human disturbance. Fishers are easily trapped. Where populations are low, fisher populations can be jeopardized by the trapping of coyote, fox, bobcat and American marten (Ruggiero et al., 1994). Habitat security in the form of low road density reduces the risk of this mortality because trapping areas are reduced.

B. Reference Condition

No accurate estimates or records exist for historic wildlife populations of fisher or American marten in the analysis area. Hudson Bay trapping records indicate that furbearers, including these two species, were trapped in the area, particularly in the northern portion of the Coeur d'Alenes. Occurrence of fishers have been documented within the last 10 years in the Coeur d'Alene Basin. It would be reasonable to infer the numbers of animals were greater than what occurs currently given the number of records within the last 10 years in the Geographic Assessment area.

C. Existing Condition

Extensive alteration of forest structure as a result of natural and human-caused disturbances (i.e. reduction in canopy closure, snags, old growth, and down woody material) has altered the habitat value for fisher and marten. Generally, the openings created by human development and timber harvesting have reduced denning habitat value, whereas the increase in canopy cover brought about by fire suppression has expanded denning habitat.

D. Environmental Consequences

Effects Common to All Action Alternatives

Analysis of the fisher reflects changes in habitat for the marten, since their habitat needs are similar. Existing open road and motorized trail densities within the project area are moderate, contributing to vulnerability or lowered security for fisher. There are no documented sightings of fishers in the Beaver Creek drainage.

The capable habitat varies in structure and age class. Some of the stands could feasibly provide suitable habitat for the fisher in 25 to 50 years. Other capable stands may have the correct tree species composition, position on the slope, and terrain features, but are very young and it may be over 100 years before they are providing habitat for the fisher.

Direct and Indirect Effects

Alternative 1: The modeling of the existing condition based on the TSMRS data base shows no suitable fisher habitat and 339 acres of capable fisher habitat within the project area. Approximately 200 acres in the project area were affected by the Douglas-fir bark beetle. Of these, many are within capable habitat. Most of the beetle mortality is scattered and not concentrated in patches that would significantly impact habitat in potential fisher areas. Additional mortality associated with the Douglas-fir bark beetle in this area is expected to be minor. Approximately 40 acres of capable fisher habitat have concentrated beetle mortality which would open up the stand canopies, setting back the period of time before these areas would achieve suitable habitat. Adjacent to some of these beetle mortality areas are root disease openings. These factors combine to make even larger areas that will require extended period of time before they become suitable habitat. Some of the beetle affected areas within fisher habitats are near or adjacent to open roads or trails. This motorized disturbance decreases the likelihood that these areas are being used by fisher.

Alternative 2: Under Alternative 2, 42 acres of modeled fisher capable habitat would be within treatment areas. There is currently no suitable fisher habitat in the project area. Six of the acres in capable habitat are located within salvage units. Even after treatments, the overstory canopy component will remain dense

enough to not set back timeframes for these areas becoming suitable habitat. However, the salvage will reduce some of the future down wood component which is important aspect of fisher habitat. Thirty-six treatment acres will have canopies reduced below 50% overstory canopy component setting back the timeframe before these area will become suitable. Approximately 21 of these 36 acres had the canopies reduced below 50% by beetle mortality. Fifteen of these 36 acres will have canopies reduced as a result of the harvest treatment. However, the proposed irregular shelterwood harvests is expected to provide some small areas of dense-canopied denning habitat scattered throughout the treatment areas. This may allow these areas to be usable by fisher sooner than more conventional regeneration harvest treatments. Again, some of the future down wood component will be reduce with the proposed regeneration treatments that would negatively affect quality fisher habitat.

Alternative 3: Under alternative 3, beetle mortality would naturally open canopies. The delay in capable habitat becoming suitable habitat would only be as a result of beetle mortality. No delay would be the result of the harvest treatment itself. Loss of some of the future down would component would again occur with this alternative but over less acres.

Cumulative Effects/Determination of Effects

The Missouri Heli Bug project would not affect suitable fisher habitat. Less than 10% of the capable habitat would have canopies opened. Some increase in disturbance would occur with sale activities but public disturbance and risk of trapping would be reduced by requiring the existing gate on the #933 road to be closed at the end of daily activities. Other ongoing and reasonably foreseeable activites within the project area are not expected to affect fisher habitat.

An assessment of cumulative effects in areas adjacent to this project were made under the Douglas Fir Beetle Project and the Small Sales EIS. Past activities, such as roading, timber harvest, trapping, and the human development of the Beaver Creek floodplain have resulted in considerable impacts to the fisher. All action alternatives under the Douglas Fir Beetle and Small Sales EIS projects were designed to reduce impacts to fisher habitat and minimize loss of security with gate closures. Disturbances with these other sale activities will be scattered and of a short-term nature. Harvest design features were incorporated to provide some future down wood component within treatment areas but some will also be lost. The Access Management Travel Plan will also reduce general public access in the Beaver Creek drainage, thereby reducing disturbance. The determination on either of the action alternatives would be that it might impact individuals but would not trend the species toward listing or threaten the viability of the species.

3.6.6. Northern Goshawk

A. Introduction

Goshawks, a sensitive species, have habitat requirements associated with components and attributes of late successional forests (USDA, 1990). While associated with mature to old growth habitat, they utilize other successional stages. For example, feeding habitat can be found in pole-sized timber stands. Habitat features important to goshawk are those which influence nest site selection and food availability. Regeneration harvest would reduce nesting (and feeding) values to zero. Reductions in canopy cover (either from stand decline or salvage treatment) would reduce the feeding value.

B. Reference Condition

Historic numbers of goshawks were likely higher than they are today. This is due to loss of old forest structure and because many of the species they prey upon were likely more numerous due to better habitat in the past.

C. Existing Condition

The Geographic Assessment indicates a greater proportion of old growth was present in the Coeur d'Alene Mountains than currently occurs. Old growth is important for northern goshawks not only for prey species habitat but also for the large trees that provide the substrate for their substantial nest structures.

Another factor influencing the amount of goshawk habitat is the amount of understory vegetation that an area produces. Because northern goshawks require a combination of adequate understory to provide prey species, and adequate clearance for flight maneuverability, some stands that historically were suitable for foraging are no longer suitable because of increased density of understory.

The project area does not contain any suitable goshawk habitat, and approximately 98 acres of modeled capable goshawk habitat. Goshawks generally prefer moderately dense mature forest structure on gradual terrain. Suitable goshawk habitat is quite similar to what is modeled as suitable fisher habitat.

Generally, because northern goshawks require a high level of canopy closure, a reduction to below 50% canopy cover would remove stands from nesting suitability. Stands with interspersed standing live trees, would however still function as foraging habitat. Those stands in which canopy closure remained above 50% would remain suitable nesting and foraging habitat (USDA Forest Service, 1990).

D. Environmental Consequences

Direct and Indirect Effects

Alternative 1: The Douglas-fir bark beetle affected Approximately 200 acres in the project area. Of these 200 affected acres, there are no areas affected within suitable or capable habitat. Most of the beetle mortality is scattered and not concentrated in patches that would significantly impact habitat in potential goshawk areas. The increase in snag numbers has probably improved prey availability for the goshawk.

Alternatives 2 and 3: Under the action alternatives, no modeled goshawk suitable or capable habitat would be within treatment areas. Salvage would however reduce some of the standing dead and future down wood component outside of these areas, which is an important component for the prey base of the goshawk.

The timber sale contract for either action alternative would include the following wording as a mitigation measure: If a goshawk nest is found, included timber may be deleted in an area of approximately 30 acres around the site, as determined by the Forest Service. If the nest is being actively used by a goshawk, the following measures may be taken: No felling, skidding, road construction or other potentially disturbing activities within approximately 1/4 mile of the nest site, as determined by the Forest Service, may occur between March 15 and August 15. This feature, in conjunction with the existing motorized disturbance in the area and small scale and duration of this project, are expected to result in no impact to the northern goshawk.

Cumulative Effects

No suitable or capable goshawk habitat will be harvested under either action alternative. Disturbance from firewood cutting and recreational use in this area reduces the likelihood that goshawks are nesting in the area. Other ongoing and reasonably foreseeable activities within the project area are not expected to affect goshawks or their habitat.

Goshawk habitat is still being provided in and adjacent to the Missouri Bug project area. An assessment of cumulative effects in areas adjacent to this project was made under the Douglas Fir Beetle Project. The cumulative effect of past activities in these areas was felt to be moderate. However, all action alternatives under the Douglas Fir Beetle Project were designed so that ongoing activity would not affect the capability of

the analysis areas to support goshawks at recommended levels (Douglas Fir Beetle FEIS, 1999, pg 301, 303). No harvest would occur in goshawk habitat under the Small Sales EIS with any of the action alternatives (Small Sales EIS, 2001, page III-216).

3.6.7. Elk

A. Introduction

White-tailed deer, moose and elk inhabit the analysis area. Elk are the primary big game species using the area. Since elk are the Management Indicator Species for big game on the Central and Southern portion of the IPNF (Forest Plan, Appendix L, p. 5), the analysis for big game will focus on elk. Consequently, white-tailed deer can adequately be represented by discussions on elk. The IPNF Forest Plan does not emphasize moose on the central and southern portion of the Forest.

B. Existing Condition

Elk are a species of social concern for management because they are regularly hunted on the Forest. Management for elk involves providing for thermal and hiding cover, and secure areas greater or equal to 250 acres in size. Existing elk habitat potential is described in further detail in the "Environmental Consequences" discussion.

C. Reference Condition

Elk are now present in greater numbers than were present historically, partially due to reintroductions in the early 1900's (Idaho Fish and Game, 1997).

D. Methodology

Elk habitat potential was calculated using the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho," (Leege, et al. 1984). "Elk habitat potential" represents the percentage of the maximum potential habitat (100 percent) that is provided to the animal. The elk model uses habitat data to predict the ability of an area to support elk populations. The factors that are used in this model include cover-forage ratios, thermal cover, summer and winter range acres, open roads, gated roads, obliterated and barriered roads, security acres, and cumulative effects of adjacent timber sale and road building activity.

Elk Habitat Units are made up of several compartments and encompass large areas. The project area lies within Elk Habitat Unit (EHU) 5. EHU 5 encompasses 51,144 acres, within compartments 111, 112, 113, 185, 186, 187, 188, 189, 190, and 191. The project area lies within compartment 188. Within this compartment there is no key elk winter or summer range. A total of 2067 acres of security are within this compartment. The Forest Plan goal for elk habitat potential in this EHU is 55 percent. The current level is 49 percent.

E. Environmental Consequences

Direct, indirect, and cumulative effects during and after post sale activities

Alternative 1: Under alternative 1, there may be some loss of thermal cover due to the Douglas-fir beetle outbreak, and some areas where the increases in canopy openings would provide forage over time rather than cover. This would have a minor effect on elk, and would not be measurable enough to cause the elk habitat potential to change. There would be no loss of security beyond the existing condition. Cumulatively, there would be no change from the existing elk habitat potential.

Effects common to Alternative 2 and 3

Under alternative 2 and 3 there would be some loss of some hiding and thermal cover beyond what bark beetles and root disease have done. Thermal cover would be reduced, to a minor extent, beyond what occurred as a result of bark beetles in the regeneration units. This would occur with the removal of smaller diameter green trees that are not expected to survive an underburn. There would also be some loss of hiding cover associated with the loss of advanced regeneration in the root disease portions of the regeneration units. The site preparation burning of the regeneration units should provide preferred foraging habitat.

Cumulatively, loss of cover is not a concern. Analysis of this area under the Beaver Salvage EA (IPNF 1996) stated that cover: forage ratios for this area were 73:27. Thermal cover within compartment 188 was approximately 77 percent. Cover is not limiting in the area.

Approximately one mile of existing gated road would be opened for activity. This could result in a slight loss of security within the project area. However, mitigation measures will include the closure of the gate at the end of each day. Post-sale conditions would return to the same security levels. The elk habitat potential for EHU 5 would remain at 49 percent during and after sale activities (Project Files-Wildlife). This is due to the small scope of this project and mitigation measures within this large EHU. The cumulative effects for the project with other ongoing and reasonably foreseeable activities is minimal within the context of this large Elk Habitat Unit. Elk habitat analysis runs indicate that the habitat potential remains at 49 percent when considering these other activities (Project Files-Wildlife). The implementation of the Access Management Travel Plan will reduce public access in this area and should increase the elk habitat potential within the EHU.

3.6.8. Consistency With Forest Policy and Legal Mandates

Forest Plan standards (Forest Plan, Chapter II, pages II-26 through II-29; Project Files, "Wildlife"), in compliance with NFMA, were incorporated into all alternatives. These standards addressed elk and elk goals, threatened and endangered species, sensitive species and old growth management. Elk habitat potential analysis was consistent with the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" as specified on page II-27 (Item 1c) of the Forest Plan.

All alternatives would be consistent with Forest Plan management direction, goals, objectives, standards and guidelines for the management and protection of wildlife and species.

All of the alternatives would comply with the Endangered Species Act of 1973 as amended (ESA) since no alternative would lead a threatened or endangered species towards extinction.

All alternatives are consistent with the January 10, 2001 Executive Order describing the Responsibilities of Federal Agencies to Protect Migratory Birds. The analysis of effects to wildlife evaluated effects of proposed activities on neotropical landbirds (migratory birds), as disclosed in Appendix A (Issues Not Discussed in Detail in this EA). As more information and direction related to this Executive Order becomes available, the analysis and documentation related to the Missouri Heli Bug project will be reviewed to determine whether a correction, supplement, or revision to the document is necessary, in compliance with Forest Service Handbook 1909.15 (Chapter 18).

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LIST OF REFERENCES

Fisheries

Bjornn, T.C. 1975. The St. Joe River cutthroat fishery - a case history of angler preference. Presented at the Western Assoc. of State Game Commissioners.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 in W.R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitat. American Fisheries Society Special Publication 19, Bethesda, Maryland.

Chamberlin, T.W., R.D. Harr, and F.H. Everst. 1991. Timber Harvesting, Silviculture, and Watershed Processes. Pages 181 – 204 in W.R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland.

Cross, P.D. 1992. Status of bull trout on the Idaho Panhandle National Forests. USDA Forest Service, Coeur d'Alene, Idaho.

Dambacher, J.M. and K.K. Jones. 1994. Stream Habitat of Juvenile Bull Trout Populations in Oregon and Benchmarks for Habitat Quality. Oregon Department of Fish and Wildlife, Research and Development Sections.

Dose, J.J. and B.B. Roper. 1994. Long-term changes in low-flow channel widths within the South Umpqua Watershed, Oregon. Water Resources Bulletin 30:993-1000.

Dunnigan, J.L. 1997. The spatial distribution of cutthroat trout in the Coeur d' Alene river system, Idaho. Master's Thesis, University of Idaho, Moscow, Idaho.

EPA (Environmental Protection Agency). Clean Water Act.
FEMAT (Forest Ecosystem Management: an ecological, economic, and social assessment). 1993. U.S. Printing Office 1993-793-071.

Furniss, M.J., T.D. Roelofs, and S.E. Yee. 1991. Road Construction and Maintenance. Pages 297 – 323 in W.R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland.

Hicks, B.J., J.D. Hall, P.A. Bisson, and J.R. Sedell. 1991. Responses of salmonids to habitat changes. Pages 483 – 517 in W.R. Meehan, editor. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland.

Jakober, M.J. 1995. Autumn and winter movement and habitat use of resident bull trout and westslope cutthroat trout in Montana. Master's thesis. Montana State University, Bozeman.

Jones, J.A., and G.E. Grant. 1996. Peak Flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon. Water Resources Research. 32:959-974.

Markle, D.F., D.L. Hll Jr., and C.E. Bond. 1996. Sculpin identification workshop and working guide to freshwater sculpins of Oregon and adjacent areas. Revision 1.1. Department of Fisheries and Wildlife. Oregon State University, Corvallis.

Mesa, Matthew G. 1991. Variation in feeding, aggression, and position choice between hatchery and wild cutthroat trout in an artificial stream. Transactions of the American Fisheries Society 120:723-727.

Reel, S, L. Schassberger, and W. Ruediger. 1989. Caring for our natural community. USDA Forest Service. Northern Region Wildlife and Fisheries publication.

Reeves, G. H., L. E. Benda, K. M. Burnett, P. A. Bisson, and J. R. Sedell. 1995. A disturbance-based ecosystem approach to maintaining and restoring freshwater habitats of evolutionarily significant units of anadromous salmonids in the Pacific northwest. American Fisheries Society Symposium 17:334-349.

Rieman, B. and K. Apperson. 1989. Status and analysis of salmonid fisheries: Westslope cutthroat trout synopsis and analysis of fishery information. Idaho Department of Fish and Game. Project F-73-R-11, Subproject No. 11, Job No. 1. Boise, Idaho.

Rieman, B.E. and J.D. McIntyre. 1993. Demographic and habitat requirements of bull trout Salvelinus confluentus. USDA Forest Service , Intermountain Research Station. General Technical Report INT-GTR-302. Ogden, Utah.

Simpson, J.C and R.L. Wallace, 1978. Fishes of Idaho. University Press of Idaho, Idaho Research Foundation, Inc. Moscow.

USDA Forest Service. 1976. National Forest Management Act. 36 CFR part 219.

USDA Forest Service. 1987. Idaho Panhandle National Forest Plan, Northern Region.

USDA Forest Service. 1995. Inland Native Fish Strategy: Interim strategies for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, western Montana and portions of Nevada. Findings of No Significant Impact report.19 and 36CFR219.19(a)(1).

USDA Forest Service. 1998. Idaho Panhandle National Forest Monitoring Plan.

USDA Forest Service. 1998. Idaho Panhandle National Forests, Douglas-fir Beetle EIS.

USDA Forest Service. NEPA (National Environmental Policy Act). 40CFR 1502.16

USDI Fish and Wildlife Service. Endangered Species Act. 1973. Section 7(c), (3/2/98 letter, FWS 1-9-99-SP-158).

Williams, R.N., Evans, R.P., and D.K. Shiozawa. 1997. Mitochondrial DNA Diversity Pattern of Bull Trout in the Upper Columbia River Basin. Pages 283 – 297 in W.C. Mackay, M.K. Brewin, and M. Monita, editors. Friends of the Bull Trout Conference Proceedings.

Fire/Fuels and Air Quality

Harvey, Alan E., Hessburg, Paul F., Byler, James W., McDonald, Gerald I., Weatherby, Julie C., and Wickman, Boyd E., 1995. Health Declines in Western Interior Forests: Symptoms and Solutions. From 1995 Symposium Proceedings of Ecosystem Management in Western Interior Forests, held May 3-5, 1994 in Spokane, Washington.

Harvey , George M. and Kenneth H. Wright. 1967. Guidelines for salvaging beetle-killed Douglas-fir. Gen. Tech. Rep. PNW-50. USDA Forest Service Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Leiberg, John B. 1897. General Report on a Botanical Survey of the Coeur d'Alene Mountains in Idaho During the Summer of 1895. From U.S. National Herbarium.

NWCG. 1992. Fire Behavior Field Reference Guide, A Publication of the National Wildfire Coordination Group.

Spurr, S.H., and B.V. Barnes, 1980. Forest Ecology. John Wiley & Sons, New York, Chapter 16, pages 421-428 and 437-439.

USDA, 1998 Fuels and Fire Effects Model: Model Description, Beakema, Sarah; Greenough, Julee; and Robinson, Don. 7/28/98, revised 2/16/1999 as a working draft.

USDA Forest Service, 1999. Idaho Panhandle National Forests. Douglas-Fir Beetle EIS, pages III 219-235.

USDA, 1996. The Use of Fire in Forest Restoration. INT-GTR-341.

USDA Forest Service. Forest Service Manual, Title 5100 Fire Management USDA Forest Service. Washington D.C.

USDI, USDA, 1996 Federal Wildland Fire Management, Policy and Program Review, Implementation Action Plan Report, May 23, 1996.

USDI, USDA, 1995. Federal Wildland Fire Management Policy and Program Review, Draft Report, June 9, 1995

Zack, Arthur. 1995 Northern Idaho Forest Ecosystems: Historic Conditions and Current Trends in Forest Succession, Fire, Timber Harvest, and Landscape Pattern, in Dynamics of Northern Idaho Forests, A symposium on Plants, Animals, and People

Zack, A and Morgan, P , 1994; Fire History on the Idaho Panhandle National Forest, Draft

Forest Vegetation

Byler, James W. and Sara Zimmer-Gorve. 1990. A Forest Health Perspective on Interior Douglas-fir Management. In Interior Douglas-fir: The Species and Its Management. Washington State University, Dept. of Natural Resource Sciences, Cooperative Extension.

Cooper, Stephen V., Neiman, Kenneth E., Roberts, David W., 1991. Forest Habitat Types of Northern Idaho: A Second Approximation. USDA Forest Service, Intermountain Research Station, General Technical Report INT-236.

Flanagan, P., 1998, Douglas-fir beetles on the Newport Ranger District, Colville National Forest: Hazard rating and outbreak characteristics; briefing paper, USDA Forest Service, Wenatchee Field Office.

Idaho Panhandle National Forests, 1998, Toward an Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin. Ecosystem Paper #4, United States Department of Agriculture, Idaho Panhandle National Forests.

Kegley, Sandra; 2000, Current Beetle Population Assessments (1999 attacks in green trees), USDA Forest Service, Unpublished. 2 pages

Kegley, Sandra; Randall, Carol; Jewett, Darryl; Wulff, Doug. 1999. Douglas-fir Beetle Population Surveys, Idaho Panhandle National Forest, 1998. Report 99-5, USDA, Forest Service, Northern Region, Missoula, MT.

Lockman, Blakey; Gibson, Kenneth E., 1998, Trip Report on visit to various locations on Kootenai National Forest regarding Douglas-fir bark beetle infestations, USDA Forest Service

USDA Forest Service, Region 1, Landscape Ecology Peer Group, 1997. Biophysical Classification: Habitat Groups and Descriptions, Finalized in 1997. United States Department of Agriculture, Missoula, Montana.

Zack, Arthur C.; Morgan, Penelope; 1994, Fire History on the Idaho Panhandle National Forest. 44 pages. United States Department of Agriculture, Forest Service.

Noxious Weeds

USDA Forest Service. 2000. Environmental Impact Statement: Noxious Weeds Management Projects. Coeur d'Alene River Ranger District, Idaho Panhandle National Forests.

Social Values

Moore, Patrick PhD., 2000, Greenspirit speech.

Rare Plants

Blake, Jill and C. Ebrahimi. 1992. Species conservation strategy and monitoring plan for Blechnum spicant (deerfern) for northern Idaho, Idaho Panhandle National Forests, and Clearwater National Forest. USDA Forest Service, Northern Region.

Cousens, Michael L. 1981. Blechnum spicant: Habitat and vigor of optimal, marginal, and disjunct populations, and field observations of gametophytes. Botanical Gazette. 142(2):251-258.

Crawford, Rex C. 1980. Ecological investigations and management implications of six northern Idaho endemic plants on the proposed endangered and threatened lists. Forest, Wildlife,and Range Experiment Station, University of Idaho, Moscow, Idaho.

Greenlee, Jack. 1997. Cypripedium fasciculatum Conservation Assessment. USDA Forest Service, Region 1. Lolo National Forest. Missoula, Montana.

ICDC, 1999. Rare plant occurrence records, Idaho Conservation Data Center, Idaho Fish and Game. Boise, Idaho.

Kagan, Jimmy. 1990. Draft Species Management Guide for Cypripedium fasciculatum for southwestern Oregon, Oregon Natural Heritage Program, Portland, Oregon. 19 pages.

Lichthardt, J. and R. K. Moseley. 1994. Ecosystem analysis and conservation planning for the Clearwater refugium, Clearwater and Nez Perce National Forests. Idaho Department of Fish and Game, Natural Resource Policy Bureau.

Lichthardt, Juanita. 1998. Monitoring of rare plant populations on the Clearwater National Forest: Third annual summary report. Idaho Department of Fish and Game, Boise, Idaho. October 1998.

Lorain, Christine C. 1990. Field investigations of Botrychium (moonworts), on the Idaho Panhandle National Forests, Idaho Dept. of Fish & Game, Boise, Idaho. December 1990.

Lorain, Christine C. 1993. Conservation assessment of Mimulus clivicola (bank monkeyflower). USDA Forest Service, Pacific Northwest, Intermountain and Northern Regions.

Mousseaux, Mark. 1998. Idaho Panhandle National Forests Rare Plant Guild Descriptions. IPNF Botanist, Coeur d'Alene, Idaho.

Regional Forester, 1999. Regional Foresters Sensitive Species List, March 1999. Missoula Montana.

USDA Forest Service, 1999. Douglas-fir Beetle Final Environmental Impact Statement. Idaho Panhandle National Forests Supervisor's Office, Coeur d'Alene, Idaho.

USDA Forest Service, 1997. Icestorm Salvage Final Environmental Impact Statement. Idaho Panhandle National Forests, Coeur d'Alene River Ranger District, Coeur d'Alene, Idaho.

USDA Forest Service. 1997. Terrestrial protocols: Species at risk. Northern Region. Missoula, MT.

USDI, 1999. US Fish and Wildlife Service, Biannual Forest Wide Species list. Reference number #FWS 1-9-99-SP-483. Upper Columbia Basin Field Office, Spokane, Washington.

USDI, 2000. US Fish and Wildlife Service, Section 7 Guidelines, Silene spaldingii, Spalding's catchfly (proposed threatened), dated January 2000. US Fish and Wildlife Service, Snake River Basin Office.

Zika, Peter. 1992. Draft management guide for rare Botrychium species (moonworts and grape-ferns) for the Mount Hood National Forest. Unpublished report on file at the Oregon Natural Heritage Program, Portland, Oregon.

Watershed

Belt, G.H., J.O. Laughlin, and T. Merrill. 1992. Design of forest riparian buffer strips for the protection of water quality: analysis of scientific literature. Idaho Forest, Wildlife and Range Policy Analysis Group. Report No. 8. University of Idaho, Moscow.

Brooks, K.N., P.F. Ffolliott, H.M. Gregersen, J.L. Thames. 1991. Hydrology and the management of watersheds. Iowa State University Press, Ames Iowa, USA. Pp 104-125.

Cline, Cole, Megehan, Patten, and Potyondy, October 1981. Guide for Predicting Sediment yields from Forested Watershed, USDA Forest Service, Northern Region and Intermountain Region.

Christner, J. and R.D. Harr. 1982. Peak streamflows from the transient snowzone, Western Cascades, Oregon. Presented at the Western Snow Conference, April 20, 1982, Reno, Nevada.

Federal Water Pollution Control Act, as amended by the Clean Water Act of 1997, PL92-500.

Forest Service Handbook 2509.22 (Soil and Conservation Handbook).

Harr, R.D. 1981. Some characteristics and consequences of snowmelt during rainfall in western Oregon. Journal of Hydrology. 53.

Harr, R.D. 1986. Effects of clearcutting on rain-on-snow runoff in western Oregon: a new look at old studies. Water Resources Research 22:7. Pp. 1095-1100.

Jones, J.A., and G.E. Grant. 1996. Peak Flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon. Water Resources Research. Vol. 32 Pp 959-974.

Kappesser, G.K. 1991. A procedure for evaluating risk of increasing peak flows from rain-on-snow events by creating openings in the forest canopy. USDA Forest Service, Idaho Panhandle National Forests.

King, John G. 1989. Streamflow Responses to Road Building and Harvesting: a Comparison With the Equivalent Clearcut Area Procedure. Research Paper INT-401. USDA Forest Service, Intermountain Research Station, Ogden, UT.

Megahan, W.F. 1983. The hydrologic effects of clearcutting and wildfire on steep granitic slopes in Idaho. Water Resources Research 19(3).

Patten, Rick. 2000. Personal communication regarding the use and limitations of the WATSED Model.

Regional Interagency Executive Committee and the Intergovernmental Advisory Committee Ecosystem Analysis at the Watershed Scale. 1995. Federal Guide for Watershed Analysis. Version 2.2. Portland, OR.

State of Idaho Department of Health and Welfare. 1992. Water Quality Status Report and Nonpoint Pollution Assessment 1992. Division of Environmental Quality, Boise, Idaho.

State of Idaho Department of Health and Welfare. 1996. Rules Governing Water Quality Standards and Wastewater Treatment Requirements, Title 1, Chapter 2, Idaho Code. Division of Environmental Quality, Administrative Procedures Section. Boise, Idaho.

State-of-Idaho Division of Envoirnmental Quality, 1998, 303 (d) List (Pp 6).

Thomas, R. and W. Megahan. 1998. Peak Flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon: a second opinion. Water Resources Research 34:12. Pp. 3393-3403.

Toews, D.D.A. and M.K. Moore. 1982. "The effects of three streamside logging treatments on organic debris and channel morphology of Carnation Creek." Pages 129-153 in G. Hartman, editor. Proceedings: Carnation Creek Workshop: a ten-year review. Malaspina College, Nanaimo, B.C.

Troendle, C.A. and R.M. King. 1983. The effect of timber harvest on the Fool Creek watershed, 30 years later. Water Resources Research 21(12).

USDA Forest Service, 1989. Watershed Response Model for Forest Management: WATBAL Technical User Guide, Rick Patten, Clearwater National Forest.

USDA Forest Service. 1993. Idaho Panhandle National Forests Guidelines for Watershed and Stream Channel Evaluations and Project Implementation. Idaho Panhandle National Forests, Coeur d'Alene, ID.

USDA Forest Service. 1995. Inland Native Fish Strategy: Interim strategies for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, western Montana and portions of Nevada. Finding of No Significant Impact.

USDA Forest Service. 1996. WATSED: Water and Sediment Yields. Range, Air, Watershed and Ecology Staff Unit, R1 USDA Forest Service and Montana Cumulative Watershed Effects Cooperative.

USDA Forest Service. February, 1998. Toward An Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin. USDA Forest Service, Idaho Panhandle National Forests. Ecosystem Paper #4.

USDA Forest Service. 1999. WATSED: Forest Plan Monitoring and Evaluation Report. Idaho Panhandle National Forests, USDA Forest Service, Northern Region.

USDA Forest Service. Unpublished. R1/R4 WATBAL Model: Guidelines for Application o the Idaho Panhandle National Forests.

Wildlife

Bate, Lisa Jean. 1995. Monitoring woodpecker abundance and habitat in central Oregon Cascades. M.S. Thesis. University of Idaho. Moscow, Idaho. 116 p.

Bull et al, May 1997. Trees and logs important to wildlife in the Interior Columbia River Basin. USDA Forest Service General Technical Report PNW-GTR-391.

Evans, Diane and Dean Martens, 1995. Snag and coarse woody debris guidelines for timber harvest projects. USDA Forest Service, Payette National Forest. McCall, Idaho. 24 p.

Jewett, et al. 1953. Birds of Washington State. University of Washington Press.

Powell, R.A. 1982. The fisher; life history, ecology and behavior. University of Minnesota Press. Minnesota. 217 pages.

Ruggiero et al, 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx and Wolverine in the Western United States. USDA Forest Service, General Technical Report RM-254. Page 57.

USDA Forest Service. 1989. Caring for Our Natural Community: Region 1 - Threatened, Endangered, & Sensitive Species Program. 309 pages.

USDA Forest Service. 1992. Our Approach to Sustaining Ecological Systems. USDA Forest Service, Region 1. Missoula, Montana.

Washington Department of Wildlife. 1991. Management recommendations for Washington's priority species habitats and species. E. Rodnick and R. Milner, eds. Washington Dept. of Wildlife. 120 pages.

ACRONYMS/GLOSSARY

CCF	Cunit (hundred cubic feet)*
CFR	Code of Federal Regulations*
ECA	Equivalent Clearcut Acres
FSH	Forest Service Handbook
INFS	Inland Native Fish Strategy
KV	Knutson-Vandenberg Act of 1924
MA	Management Area*
MBF	Thousand Board Foot
MMBF	Million Board Foot
NEPA	National Environmental Policy Act*
NFMA	National Forest Management Act*

* These terms are defined in the Glossary below.

A

Affected Environment. The natural, physical, and human-related environment that is sensitive to changes due to proposed actions.

Air Quality. Refers to standards for various classes of land as designated by the Clean Air Act, P.L. 88-206: Jan. 1978

Airshed. A geographical area that, because of topography, meteorology, and climate, shares the same air.

Allowable Cut. Amount of timber which can be harvested in any given year.

Allowable Sale Quantity (ASQ). The quantity of timber that may be sold on the Idaho Panhandle National Forests from the area of land suitable for timber management, as directed in the Forest Plan.

Alluvial. Materials transported and deposited by water.

B

Background (Visual Distance Zone). That part of a scene, landscape, etc., which is furthest from the viewer, usually three miles to infinity from the observer.

Basal Area. Area of the cross section of a tree stem near the base, generally at breast height and inclusive of bark.

Best Management Practices (BMP). Practices determined by the State to be the most effective and practicable means of preventing or reducing the amount of water pollution generated by non-point sources, to meet water quality goals.

Big Game. Those species of large mammals normally managed as a sport-hunting resource.

Biodiversity or Diversity. The relative distribution and abundance of different plant and animal communities and species within an area.

Board Foot (BF). A unit of measurement equal to an unfinished board one foot square by one inch thick.
Broadcast Burn. See Prescribed Burning.

C

Canopy. More or less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

Cavity Habitat. Snags, broken-topped live trees and down logs used by wildlife species that excavate and/or occupy cavities in these trees.

Clearcut Harvest. A regeneration method under an even-aged silvicultural system. As suitable seed trees are either non-existent or unprotectable, all trees within a defined area are removed at one time. Reserve trees may be left in the unit.

Climax Vegetation. The culminating stage in plant succession for a given site where the composition of the vegetation has reached a highly stable condition over time and perpetuates itself unless disturbed by outside forces.

Code of Federal Regulations (CFR). The listing of various regulations pertaining to management and administration of the National Forests.

Compartments. A geographic area delineated by a subwatershed drainage for management planning purposes.

Condition Class. A descriptive category of the existing tree vegetation as it relates to size, stocking, and age.

Conifer. Any of a group of needle and cone-bearing evergreen trees.

Council on Environmental Quality (CEQ). An advisory council to the President, established by NEPA. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cover. Vegetation used by wildlife for protection from predators, or to adverse weather conditions, or in which to reproduce. The different types are identified as hiding cover, thermal cover, and security areas.

Cover/Forage Ratio. The ratio, in percent, of the amount of area in cover conditions to that in forage conditions.

Cunit (CCF). One hundred cubic feet. A measurement for timber volume.

Cultural or Heritage Resources. The physical remains of human activity (artifacts, ruins, burial mounds, pertroglyphs, etc.) having scientific, prehistoric, or social values.

Cumulative Effect. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time.

D

Developed Recreation. Recreation dependent on facilities provided to enhance recreation opportunities in concentrated use areas. Examples are ski areas, resorts and campgrounds.

Dispersed Recreation. Recreation that occurs outside of developed recreation sites; requiring few, if any, facilities or other improvements; and includes such activities as hunting, hiking, viewing scenery and cross-country skiing.

E

Ecosystem. The organisms of a particular habitat together with the physical environment in which they live; a dynamic complex of plant and animal communities and their assosicated environment.

Ecosystem management. Using an ecological approach to achieve the multiple-use management of national forests and grasslands by blending the needs of people and environmental values in such a way that national forests and grasslands represent diverse, healthy, productive and sustainable ecosystems.

Edge. Where plant communities meet or where successional stage or vegetation conditions within the plant community come together.

Effects (or impacts). Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

Endangered Species. Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range. (Endangered Species Act of 1973).

Endemic. The population of potentially injurious plants, animals, or diseases that are at their normal, balanced level, in contrast to epidemic.

Ephemeral Streams. Streams that flow only as a direct response to rainfall or snowmelt events. They have no baseflow.

Epidemic. The population of potentially injurious plants, animals, or diseases that are widely prevalent, and exceed their normal, balanced level, in contrast to endemic levels.

Erosion. Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is much more rapid than normal, natural, or geologic erosion, primarily as a result of the influence of activities of people animals, or natural catastrophes.

Even-aged Management. The application of a combination of actions that results in the creation of stands of trees of essentially the same age, growing together. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

F

Forage. Vegetation used for food by wildlife, particularly big game wildlife and domestic livestock.

Forage Areas. Vegetated areas with less than 60 percent combined canopy closure of tree and tall shrub (greater than seven feet in height).

Foreground (Visual Distance Zone). That part of a scene, landscape, etc., which is nearest to the viewer, and in which detail is evident, usually one quarter to one half mile from the observer.

Fry. Recently hatched fish.

Fuels. Combustible materials present in the forest which potentially contribute a significant fire hazard.

Fuels Management. Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

G

Group Selection. A modification of the selection system in which trees are removed periodically in small groups, resulting in openings that are at least one and one-half times the height of the trees removed. The objective is to create a balance of size and age in a mosaics of contiguous groups in the same forest.

H

Habitat Type. (Vegetative). An aggregation of all land areas potentially capable of producing similar plant communities at climax.

Hardwoods. A conventional term for the wood of broadleaf trees.

Hiding Cover. Vegetation capable of hiding 90 percent of a standing adult deer or elk at 200 feet or less. Includes some shrub stands and all forested stand conditions with adequate tree stem density or shrub layer to hide animals. In some cases, topographic features also can provide hiding cover.

I

Immediate Foreground (Visual Distance Zone). That part of the foreground which is extremely critical for visual detail, usually within 400 feet of the observer.

Indicator Species. Species of fish, wildlife, or plants adapted to a particular kind of environment, which reflect ecological changes caused by land management activities.

Indirect Effects. Secondary effects which occur in locations other than the initial action or significantly later in time.

Individual Tree Selection. The selection of trees for harvest based on individual tree characteristics, and their position within the stand structure.

Inland Native Fish Strategy. A decision amending Regional Guides for the Forest Service's Intermountain, Northern, and Pacific Northwest Regions, and Forest Plans for 22 National Forests. The strategy provides interim direction to protect habitat and populations of resident native fish, through riparian management objectives, standards and guidelines, and monitoring requirements.

Interdisciplinary Approach. Utilization of one or more individuals representing areas of knowledge and skills focusing on the same task, problem, or subject. Team member interaction provides needed insight to all stages of the process.

Intermittent Stream. A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow.

Irretrievable. Applies to losses of production, harvest, or a commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used

as a winter sports (recreation) site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible. Applies primarily to the use of nonrenewable resources, such as minerals, or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Issue. A point, matter, or question of public discussion or interest, to be addressed or resolved through the planning process.

Issue Indicator. A specific, measurable element which expresses some feature or attribute relative to an issue.

L

Land Allocation. The assignment of a management emphasis to particular land areas with the purpose of achieving goals and objectives. Land allocation decisions are documented in environmental analysis documents, such as the Forest Plan for the Idaho Panhandle National Forests.

Landtype. A unit of land with similar designated soil, vegetation, geology, topography, climate and drainage. The basis for mapping units in the land systems inventory.

Leave Island. Group of trees within a harvest unit that are left unharvested.

Lodgepole Pine. See Timber Types.

Long-term Sustained Yield. The estimated timber harvest that can be maintained indefinitely over time, once all stands have been converted to a managed state under a specific management intensity consistent with multiple-use objectives.

M

Management Area (MA). Geographic areas, not necessarily contiguous, which have common management direction, consistent with the Forest Plan allocations.

Management Direction. A statement of multiple use and other goals and objectives, along with the associated management prescriptions and standards and guidelines to direct resource management.

Management Prescription. A set of land and resource management policies that, as expressed through Standards and Guidelines, creates a Desired Future Condition over time.

Mature Timber. On lands allocated for timber harvest, and for the purpose of this project, mature is defined as trees or stands in which average annual stand growth has culminated, generally around 80 years. In the context of wildlife - Mature forest habitat with characteristics needed to provide habitat for species such as pine marten and pileated woodpecker (generally occurs around age 100).

Middleground (Visual Distance Zone). That part of a scene or landscape which hits between the foreground and background zones.

Mixed Conifer. See Timber Types.

Monitoring and Evaluation. The evaluation, on a sample basis, of Forest Plan management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

Mortality. Trees of commercial species, standing or down, that have died during a specific period, and were not cull trees at the time of death.

N

National Environmental Policy Act (NEPA) Process. An interdisciplinary process, which concentrates decisionmaking around issues, concerns, alternatives and the effects of alternatives on the environment.

National Forest Management Act (NFMA). Law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring preparation of Regional Guides and Forest Plans, and the preparation of regulations to guide that development.

Natural Regeneration. Renewal of a tree crop by natural means using natural seed fall.

No-Action Alternative. The No-Action Alternative is required by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The No-Action Alternative provides a baseline for estimating the effects of other alternatives. Where a project activity is being evaluated, the No-Action Alternative is defined as one where current management direction would continue unchanged.

Nongame Species. All wild animals not subject to sport-hunting and fishing regulations.

Noxious Weeds. Rapidly spreading plants which can cause a variety of major ecological impacts to both agriculture and wild lands.

O

Open Road Density. A standard set in the Forest Plan that is applied to most Management Areas important to big game. This road density standard of three-quarters of a mile of open road per square mile of habitat correlates directly to the elk habitat effectiveness of the area.

Outputs. The goods and services produced from and offered on National Forest System lands.

Overmature Timber. For the purpose of this project, overmature stands are considered to be approximately 100 years of age or greater, average annual stand growth has culminated, or in which mortality often exceeds growth.

Overstory. The portion of trees in a forest which forms the uppermost layer of foliage.

P

Partial Cut. Term to relate harvest units where many trees are left ad forested appearance is retained. Partial cutting usually provides no long-term benefits to forest health and productivity.

Payments to Counties. The portion of receipts derived from Forest Service resource management that is distributed to State and county governments, such as the Forest Service 25 percent fund payments.

Perennial Streams. Streams that flow continuously throughout the year.

Preferred Alternative. The alternative recommended for implementation in an EIS (40 CFR 1502.14).

Prescribed Burning. The intentional application of fire to wildland fuels in either their natural or modified state under such conditions as to allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., silviculture, wildlife management, reduction of fuel hazard, etc.).

Prescribed Fire. A wildland fire burning under preplanned specified conditions to accomplish specific planned objectives. It may result from either a planned or unplanned ignition.

Prescription. Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.

Programmatic Document. An environmental document that establishes a broad management direction for an area by establishing a goal, objective, standard, management prescription and monitoring and evaluation requirements for different types of activities which are permitted. It also can establish what activities are not permitted within the specific area(s). This type of document does not mandate or authorize the permitted activities to proceed.

Project Area. The geographic area defining the scope of this document and the alternatives proposed by it.

R

Rain-on-Snow Event. A winter storm that is characterized by precipitation falling as rain, rather than snow, and melting of existing snowpack.

Range of Alternatives. An alternative is one way of managing the National Forest, expressed as management emphasis leading to a unique set of goods and services being available to the public. A range of alternatives is several different ways of managing the Forest, offering many different levels of goods and services.

Reforestation. The natural or artificial restocking of an area with forest trees; includes measures to obtain natural regeneration, as well as tree planting and seeding. The work is done on National Forests to produce timber and other forest products, protect watershed functioning, prevent erosion, and improve other social and economic values of the forests, such as wildlife, recreation, and natural beauty.

Regeneration. The renewal of a tree crop, whether by natural or artificial means. This term may also refer to the crop (seedlings,saplings) itself.

Regeneration Harvest. Used in reference to clearcut, seedtree and shelterwood harvest methods which remove an existing stand to prepare a site for regeneration.

Rehabilitation. To return unproductive lands, other than roads and trails, into good health through stabilization so as to produce the same vegetation (or similar species) as found on adjacent areas.

Residual Stand. Trees remaining standing after some event, such as selection cutting.

Restricted Road. A National Forest road or segment which is restricted from a certain type of use or all uses during certain seasons of the year or yearlong. The use being restricted and the time period must be specified. The closure is legal when the Forest Supervisor has issued and posted an order in accordance with 36 CFR 261.

Riparian Areas/Habitats. Areas of land that are directly affected by water, usually having visible vegetation or physical characteristics reflecting this water influence. Streamsides, lake edges, or marches are typical riparian areas.

Road Maintenance. The upkeep of the entire Forest Development Transportation Facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization.

Rotation. The planned number of years required to establish (including the regeneration period) and grow timber crops to a specified condition or maturity for regeneration harvest. Selected management prescriptions provide the basis for the rotation age.

S

Salvage Harvest. The cutting of trees that are dead, dying, or deteriorating before they lose commercial value as sawtimber. The removed trees are generally overmature, damaged by fire, wind, insects, fungi or other injurious agencies.

Sanitation Harvest. Removal of dead, damaged or susceptible trees to prevent the spread of pests or pathogens.

Sawtimber. Trees containing at least one 12-foot sawlog or two noncontiguous 8-foot log, and meeting regional specifications for freedom from defect. Softwood trees must be at least 9 inches in diameter at breast height, and hardwood trees must be 11 inches in diameter at breast height.

Scoping. The procedures by which the Forest Service determines the extent of analysis necessary for a proposed action, i.e., the range of actions, alternatives, and impacts to be addressed, identification of significant issues related to a proposed action, and establishing the depth of environmental analysis, data, and task assignments needed.

Sediment. Any material carried in suspension by water, which will ultimately settle to the bottom. Sediment has two main sources: from the channel area itself and from disturbed sites.

Seed Tree. A tree selected as a natural seed source within a shelterwood or seedtree harvest cut; sometimes also reserved for seed collection.

Seed Tree Harvest. Similar to clearcutting, except a smaller number of better seedbearing trees of the desired species per acre are left singly or in small groups distributed over the area.

Seedlings and Saplings. Non-commercial-size young trees, generally occurring in plantations.

Selection Harvest. The periodic removal of trees, usually at 10-20 year intervals, individually or in small groups, from an uneven-aged forest in order to realize yield and establish regeneration of irregular constitution.

Sensitive Species. Those species identified by the Regional Forester for which population viability is a concern as evidenced by significant current or predicted downward trends in (a) population numbers or density, or (b) habitat capability that would reduce a species' existing distribution.

Seral Stage. A transitory or developmental stage of a biotic community in an ecological succession (does not include climax successional stage or pioneer stage).

Shade Intolerant. Tree species which regenerate best in direct sunlight.

Shade Tolerant. Tree species which regenerate best in a shaded environment.

Shelterwood Harvest. A regeneration system in which a new stand is established under the protection of a partial canopy of trees. A minimum of two harvests is required, the last or final removal cut removing the remaining old stand after the new stand is established. This results in continuous coverage of large or small trees.

Silvicultural System. A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the cuttings that remove the mature crop and provide for regeneration, and according to the type of forest thereby produced.

Site Preparation. A general term for a variety of activities that remove or treat competing vegetation, slash, and other debris that may inhibit the establishment of regeneration.

Slash. The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning of trees.

Snag. A standing dead tree usually without merchantable value for timber products, but may have characteristics of benefit to some cavity nesting wildlife species.

Special Use Permit. A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest System lands for some special purpose.

Stand. A community of trees or other vegetation uniform in composition, constitution, spatial arrangement, or condition to be distinguishable from adjacent communities.

Stand Conversions. Application of silvicultural practices that change the species composition of trees in a stand, including planting a variety of species, discrimination against undesirable species during thinning, and other practices that naturally discriminate against undesirable species, such as specific site preparation and harvest methods.

Stocking. The degree to which trees occupy the land, measured by basal area and/or number of trees by size and spacing, compared with a stocking standard; that is, the basal area and/or number of trees required to fully utilize the land's growth potential.

Stream Order. It is often convenient to classify streams within a drainage basin by systematically defining the network of branches. Each nonbranching channel segment (smallest size) is designated a first-order stream. A stream which receives only first-order segments is termed a second-order stream, and so on. The order of a particular drainage basin is determined by the order of the principle or largest segment.

Successional Stage. A stage or recognizable condition of a plant community which occurs during its development from bare ground to climax.

Suitable Forest Land. Forest land (as defined in CFR 219.3, 219.14) for which which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions; for which there is reasonable assurance that such lands can be adequately restocked (as provided in CFR 219.4); and for which there is management direction that indicates that timber production is an appropriate use of that area.

Sustained Yield. See Long-term Sustained Yield.

T

Thermal Cover. Vegetation used by animals to modify the adverse effects of weather. A forest stand that is at least 40 feet in height with tree canopy cover of at least 70 percent provides thermal cover. These stand conditions are achieved in closed sapling-pole stands and by all older stands unless the canopy cover is reduced below 70 percent. Deciduous stands may serve as thermal cover in summer, but not in winter.

Thinning. Cutting in even-aged stands to redistribute growth potential or benefit the quality of the residual stand.

Threatened Species. Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and which has been designated in the Federal Register as such. In addition, some States have also declared certain species as Threatened in their regulations or statutes.

Tiering. Refers to the coverage of general matters in broader Environmental Impact Statements or Environmental Assessments with subsequent other related statements in Environmental Assessments incorporated, by reference, the discussions contained in the previous document, solely on the issues specific to the statement subsequently prepared.

Timber Base. Lands within the Forest that are capable, available, and suitable for timber production.

Timber Types. A descriptive classification of forestland based on present occupancy of an area by tree species (i.e., lodgepole, mixed conifer). More appropriately called forest cover types, this category is further defined by the composition of its vegetation and/or environmental factors that influence its locality.

Tractive. Any logging system which uses ground-based machines.

U

Understory. Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

Uneven-age Management. The application of a combination of actions needed to simultaneously maintain continuous high-forest cover. Cutting methods that develop and maintain uneven-aged stands are individual-tree and group selection.

Unplanned Ignition. A fire started at random by either natural or human causes or a deliberate incendiary fire.

Unroaded. Area characterized by its lack of existing roads, but not designated as a Roadless Area or Wilderness.

Unsuitable Forest Land. Lands not selected for timber production in Step II and III of the suitability analysis during the development of the Forest Plan due to: (1) the multiple-use objectives for the alternative preclude timber production; (2) other management objectives for the alternative limit timber production activities to the point where management requirements set forth in 36 CFR 219.27 cannot be met; and (3) the lands are not cost-efficient over the planning horizon in meeting forest objectives that include timber production. Land not appropriate for timber production shall be designated as unsuitable in the Forest Plan.

V

Viable Population. Minimal population level to maintain the genetic diversity of a species.

Viewshed. Sub-units of the landscape where the visitor's view is contained by topography similar to a watershed.

Visual Quality Objective (VQO). A system of indicating the potential expectations of the visual resource by considering the frequency an area is viewed and the type of landscape.

Visual Resource. The composite of landforms, water features, vegetative patterns and cultural features which create the visual environment.

W

Watershed. Entire area that contributes water to a drainage system or stream.

Wildfire. Any wildfire not designated and managed as a prescribed fire with an approved prescription.

Wildlife Diversity. The relative degree of abundance of wildlife species, plant species, communities, habitats or habitat features per unit area.

Y

Yarding. A method of bringing logs in to a roadside area or landing, for truck transport. Methods may include forms of skyline cable logging systems, ground-based skidding, balloon, helicopter, etc.

Yield. Measured output; for example, timber yield or water yield.

APPENDIX A
PUBLIC INVOLVEMENT AND ALTERNATIVE DEVELOPMENT

Scoping

Scoping is an early process for identifying the issues related to the proposed action, and the extent of those issues. The public was notified of this project in several ways:

- "Quarterly Schedule of Proposed Actions" for the IPNFs (January 2001 issue)
- legal ad in the newspaper of record (Spokesman-Review) dated February 16, 2001
- scoping letter for those that requested additional information dated February 16, 2001

During scoping, letters were received from Bryan Bird, (Forest Conservation Council), Jeff Juel (Ecology Center), and Mike Mihelich (Kootenai Environmental Alliance). Copies of their letters and Forest Service response to comments are provided later in this section.

The team has considered concerns identified by the public and incorporated their ideas whenever possible. Refer to Appendix A for a detailed discussion of public involvement efforts, how public comments led to issues and alternatives, and how public concerns were addressed. Additional documentation is provided in the Project Files.

Issues

Two levels of issues are used in this analysis. **Key issues** are those that are of sufficient concern to drive development of alternatives to the extent feasible within the physical, biological, and legal limits of forest management. The issues are specific to this geographic area and this proposal. The key issues include:

- Forest vegetation
- Fuels

Other issues were not key in developing alternative concepts. They are important for their value in assessing specific protective measures. These protective measures become features of the alternatives and/or specific mitigation measures. They have been addressed in detail either because it is required that effects be analyzed to comply with legal mandates, the effects will have a bearing on the decision to be made, or because these resources are of interest or concern to the public. These resource issues include:

- Economic values (finances)
- Aquatic resources (watersheds and fisheries)
- Wildlife

Issues Not Discussed in Detail in This EA

During the course of this analysis, the public and project resource specialists identified other issues that could be relevant to the proposed project. Each issue was considered by the appropriate team member to determine if/how it is related to the proposal and the level of potential impact. As a result, a decision was made either to address the issue in detail in this EA, or not to address the issue in detail. There were three situations in which an issue was not addressed in detail: 1) the issue is beyond the scope of this project; 2) there will be little or no effect to the issue of concern; or 3) the issue has been effectively addressed through specific alternative features and/or mitigation measures.

These include:

- Specific Threatened, Endangered and Sensitive Wildlife Species (gray wolf, bald eagle, lynx, flammulated owl, boreal toad, common loon, Coeur d'Alene salamander, harlequin duck, Northern leopard frog, Townsend's big-eared bat, and wolverine
- Other wildlife species and habitat (American marten, pileated woodpecker, forest land birds, and snags and down woody habitat)
- Threatened, Endangered, Proposed, and Sensitive Plants
- Noxious Weeds
- Air quality
- Soils
- Heritage resources
- Transportation Planning
- Grazing allotments
- Public safety
- Social Values
- Recreation
- Scenery

For each of these, a brief overview of the issue and the reason for not providing further documentation in the EA is provided below.

Threatened, Endangered and Proposed Wildlife Species

Gray Wolf. The likelihood of affecting wolves by activities proposed under the Missouri bug project is low since there are no known packs and no known sightings within the project or immediately adjacent areas. There is no winter range proposed for harvest under this proposal. It is unlikely that the prey population is limiting for the gray wolf given the high numbers of prey availability.

Analysis shows that design features would adequately protect big-game populations, and there would be no measurable change in wolf habitat. This project may have a minor increase in disturbance short term (a period of only about 1-3 months) above the existing levels and could affect prey base by temporarily displacing big game. However, some of the treatment areas are located near main arterial roads that receive considerable recreational traffic, often associated with firewood gathering, berry-picking, and access routes to other areas of the Forest. These routes also receive considerable winter recreational traffic as the #933 and 1586 are groomed snowmobile routes. In the long term, under either alternative, there is no substantial change to existing conditions with no change to road densities or habitat capability of the area. Though the project area is potential habitat, it is not likely to be occupied due to fragmentation and year-round recreational disturbances surrounding the area. Since the scope of this project is small, short duration, and in an area frequently disturbed by recreational users, it is not expected to have any effect on gray wolves.

Bald eagle. None of the proposed harvest units or helicopter flight paths would affect potential bald eagle habitat. Beaver Creek could provide habitat for bald eagle; however due to settlement along the creek, habitat is considered marginal. No suitable nesting sites exist within or near the project area. The nearest helicopter landing would be over ¼ mile from Beaver creek. Based on these features, this project would have no effect on the bald eagle.

Lynx. The Canada Lynx Conservation Assessment and Strategy (USDA Forest Service, 2000) has identified high integrity areas or Lynx Analysis Units (LAU's) to be managed for lynx. Six LAU's and two Lynx Travel Corridors have been established on the Coeur d'Alene River District for the management and further protection of lynx populations. None of the harvest units are located within or near any of the Lynx Analysis

Units or Lynx Travel Corridors. The LAU's for the Coeur d'Alene basin are located over 5 air miles to the east of the project area. This, in combination with the existing disturbance factors, small scope of the project, and the human habitation along Beaver Creek, will likely result in no effect on lynx populations.

Sensitive Wildlife Species

Flammulated owl. Flammulated owls are seasonal migrants that occupy home ranges in the northern latitudes during the spring, summer and fall. They depend upon naturally-occurring or excavated cavities for nesting. Consequently, snags and other defective trees are an important component of their breeding habitat.

These owls are attracted to relatively open, older forests featuring ponderosa pine and Douglas-fir that are correlated 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 was at least present, if not dominant. The flammulated owl's preference for ponderosa pine and/or Douglas-fir can also be linked to prey availability. Reynolds and Linkhart noted a stronger correlation between prey availability and ponderosa pine and Douglas-fir, than with other common western conifers.

No populations numbers exist for this species' historic condition; however, a geographic assessment of the Coeur d'Alene River basin determined that the historic amounts of dry site large/mature and old-growth ponderosa pine and Douglas-fir were much more numerous than currently. This is due to several reasons. Low intensity wildfires that maintained these stands in suitable conditions for flammulated owls have been essentially eliminated by aggressive fire suppression. Timber harvesting has fragmented stands into smaller patches. These lower elevation, low gradient areas are also suitable for human development. These factors have dramatically reduced the amounts of suitable habitat for this species. Approximately 95% of suitable habitat has been reduced within the Lower Clark Fork Ecological Unit; the Coeur d'Alene drainage is part of this ecological unit (Wisdom, in press). Much of the habitat loss is due to urban and agricultural development on low elevation private lands outside the forest boundary.

Based on modeling against the timber stand data base (TSMRS), there is no suitable flammulated owl habitat within the project area. All treatment areas proposed under this project are outside of modeled flammulated owl capable habitat (see Project Files - Wildlife). Also, field reconnaissance indicates that a ponderosa pine stand component, preferred by flammulated owls, is lacking in the vicinity of the proposed treatment areas. Therefore, this project will have no adverse effect on flammulated owls or their habitat. Proposed vegetative restoration treatments considered in this proposal may increase habitat over the long term but it would be very small in scale.

Boreal toad. Preliminary analysis shows that Inland Native Fish Strategy guidelines concerning riparian habitat conservation areas within 150 ft. of the edge of wetlands would prevent sedimentation of toad breeding habitat. Most of the proposed treatment units are upslope near major ridgelines. Units 1a-c will have a 300 feet no harvest buffer along Scott Creek. No alternatives will measurably change water yields or flows downstream from the treatment areas. Therefore, it was determined that there would be no affect to boreal toads or habitat with this proposal.

Common loon. Loons are large, heavy-bodied birds with their legs and feet positioned far to the rear. This allows them to propel quickly under water but renders them unable to walk well on land or to take off without a long expanse of water. They require lakes of at least 10 acres in order to gather enough speed to take off. Lakes suitable for nesting are 10 acres or larger with emerging shoreline vegetation and secluded areas for nesting and brood rearing (USDA Forest Service, 1989). Loons have been sighted on Coeur d'Alene Lake and Fernan Lake.

Since loons are located on lakes, and the project area is not near or adjacent to a lake, the proposed actions would not affect habitat for loons. No further analysis and discussion is necessary for this species.

Coeur d'Alene salamander. All alternatives associated with this project would have a minimal effect on water quality from increased sedimentation released into the watershed over the existing condition created by the beetles (please refer to the watershed discussion). No timber harvest would occur within streamside buffers defined by the Inland Native Fish Strategy. No road construction or reconstruction would occur with this proposal. No known or potential Coeur d'Alene Salamander habitat would be impacted by this project. No further analysis and discussion is necessary for this species.

Harlequin duck. There would be no activities under any of the alternatives that would affect harlequin duck habitat or cause a change in streamflow downstream from the treatment areas. Water quality is expected to be maintained under the action alternatives (please refer to the "Watershed" section for a detailed discussion on water yield). Harvest using helicopter yarding methods and a lack of a transporting system in the area to move sediment would result in no impact to habitat downstream from the treatment area. For these reasons, the risk factors to harlequin ducks have been avoided through project location and design features. The human habitation and disturbance factors along Beaver Creek also reduce the likelihood that Harlequin ducks are using this drainage. Therefore, no further analysis or discussion is warranted.

Northern leopard frog. Preliminary analysis shows that Inland Native Fish Strategy guidelines concerning riparian habitat conservation areas within 150 feet of the edge of wetlands would prevent sedimentation of frog breeding habitat. As described above under the boreal toad section, this project would have no effects to the northern leopard frog or its habitat. Therefore, no further analysis or discussion is needed.

Townsend's big-eared bat. There are no known mine portals or caves in Missouri and Scott drainages. Therefore it is unlikely that habitat for Townsend's big-eared bat is present. Therefore, it is unlikely the project would have measurable impacts on the Townsend's big-eared bat. Therefore, no further discussion and analysis is necessary.

Wolverine. Based on their wide-ranging nature, lack of existing habitat components (i.e. both denning habitat and large sparsely inhabited wilderness areas) and sighting information, recorded wolverine occurrences in the Coeur d'Alene River drainage are likely transient individuals. There is no wolverine denning habitat within or adjacent to the activity areas of the Missouri Heli Bug project.

Risk of disturbance during the sensitive denning period is not a factor in this project. Relatively high road densities in the Coeur d'Alene drainage (on both National Forest and non-National Forest System lands) limit the drainage's suitability as wolverine habitat. Human habitation along the Beaver Creek drainage also reduces the likelihood of wolverines using this area. Therefore, no additional analysis is necessary.

Management Indicator Wildlife Species

American Marten. This species has the same habitat requirements as the fisher. Any changes in fisher habitat are the same for marten. Refer to the fisher analysis in Chapter III (Wildlife) for impacts to the marten.

Pileated Woodpecker. Design features for alternatives would assure that snags for pileated woodpecker would be maintained in harvest units under all alternatives (See Features Designed to Protect Wildlife Habitat, Chapter II). The project is designed to maintain at least the minimum number of snags needed to support woodpecker populations, distributed uniformly across the landscape (please refer also to the discussion on "Snags and Dead Down Woody Habitat," in the Wildlife section of Chapter III). Snag retention within treatment units will also be of the largest diameter classes which is also preferred by pileated woodpecker. Also, not all areas affected by bark beetle mortality are being considered for harvest within the project area. Some snag patches are being retained for habitat. Approximately 75 acres of timber that is being managed for old growth habitat within the project area has considerable beetle mortality. No harvest treatment is being proposed in this old growth area so there will be a dense patch of larger diameter snags retained in the project

vicinity. For these reasons, it is unlikely the project would have measurable impacts on pileated woodpeckers. Therefore, no further discussion or analysis is necessary.

Other Wildlife Species and Habitat

Forest land birds. A wide range of canopy conditions exist throughout the study area providing adequate habitat for a wide range of neotrophical birds with or without the proposed treatment. One of the primary concerns to neotropical migrant birds is the risk of nest parasitation by cowbirds. Brown-headed cowbirds pose a threat to neotropical migrant birds. The cowbird is a nest parasite which lays its eggs in the nests of over 250 species of birds (Friedmann and Kiff, 1985), the majority of which are neotropical migrants. The clearing of forests for agriculture and the introduction of livestock in the west have expanded the range of cowbirds (Robinson, Scott et al., 1992). There is some indication that cowbirds may currently be on the decline in Idaho (Ritter, pers. comm.). Cowbirds pose a threat to many hosts because of the cowbirds extraordinary productivity and the extent to which cowbird parasitism reduces host productivity. Rothstein (1984) found cowbirds traveling up to 7 kilometers between feeding and nest searching sites. Timber harvest in forested landscapes provide the cowbird with opportunities for nest parasitism.

Types of logging practices used may have little impact on cowbird parasitism levels and cowbirds are just as likely to parasitize nests in group selection cuts as in clearcuts (Robinson, et al., 1992). Edge effect will be created by regeneration harvests, however the areas will be managed as forest lands over the long term. The regeneration harvest areas would provide potential cowbird habitat for less than 20 years.

The project area is located upslope from privately owned lands in the Beaver Creek floodplain. There are approximately 20-30 cows that graze on this private ownership, but most of the activity is south of Scott Creek away from the project area. The project area is located within a small part of a larger National Forest grazing allotment. This allotment only receives occassional use by low numbers (less than 10) cows. It is also felt that not much grazing activity occurs in the project area portion of the allotment based on lack of sightings of livestock usage within the project area. Seasonal livestock concentration areas, such as trailheads used by hunters for their horses in the fall, are not common within the project area. The presence of livestock in these seasonal areas is generally considered to be of such a short-term nature that suitable cowbird feeding areas are not created.

Because a detailed analysis has been conducted for other species (goshawks and black-backed woodpeckers) that share similar habitats and based on the effects described above, species in this group are not analyzed further in this document.

Snags and dead down woody habitat. Historically, ecosystems in north Idaho were shaped by disturbance patterns that altered the size and distribution of various structures across the landscapes. Forest succession, wind damage, insects and disease, fire and other disturbances created snags in areas that ranged in size from individual trees to small patches or stands to entire drainages (1,000 acres or more). Consequently, snag densities varied across the landscape, from areas with low levels of snags to other areas with abundant snags.

Recent studies indicate that viable woodpecker populations occurred in areas with about four snags per acre (Bull et al. 1997). Managing for viable populations of snag dependent species does not require providing for snags on every acre in any subdrainage or across the landscape. Bull et al. (1997) recommends providing snags in every 5 to 25-acre stand to satisfy distribution needs.

The present bark beetle outbreak has, is and will continue to kill live trees (though the beetle population is declining), thereby creating snags and areas of high snag densities. The scope of the bark beetle infestation is discussed elsewhere in this document. In the action alternative some snags created by bark beetles would be harvested and lost as habitat for cavity dependent species. However, the potential effects on snags and down wood is ameliorated by a number of factors.

Not all areas impacted by bark beetles would be treated; it is not the intent of this project to remove all pockets/patches of dead trees created by the Douglas-fir bark beetle outbreak. Concentrated pockets of snags would remain untreated and unaffected by any management across the landscape. Areas outside of proposed treatment areas are and would continue to provide snags in excess of numbers shown to support viable populations. Areas would be reserved from treatment within Inland Native Fish Strategy buffers. These areas along with untreated stands would contribute to snags and cavity habitat.

Design features of the project were devised to ensure the retention and selection of snags at a level and distribution which has been shown to support viable populations of species which use snags and logs (Features Common to All Action Alternatives, Chapter II). Snags and snag replacements would be retained in all treatment units at levels recommended by the Northern Region Snag Management Protocol (2000). Snag retention objectives exceed Forest Plans standards and snag retention levels developed by Thomas et al. (1979). Snag retention objectives, including compensation levels are consistent with recent published data that suggests that populations of cavity nesters were viable in stands of mixed conifer forests that contained about four snags per acre (Bull et al. 1997).

To retain a down wood component, marking guides will designate that 15-20 down logs per acre be retained on moist sites and 3-6 logs per acre will be retained on dry sites. These logs should be at least 12 inches in diameter and 6 feet or more in length. The snag retention component will add to the down wood component over time.

The project would meet Forest Plan goals and objectives for cavity habitat, and Forest Plan standards would be met or exceeded in all alternatives.

Threatened, Endangered, Proposed and Sensitive Plant Species

The US Fish and Wildlife Service (USDI 1999) list two species as threatened for the Idaho Panhandle National Forests, water howellia (*Howellia aquatilis*) and Ute ladies'-tresses (*Spiranthes diluvialis*). There are no documented occurrences of these species on the Idaho Panhandle National Forests, although suitable habitat is suspected to occur. The recent Douglas-fir beetle outbreak has not affected suitable habitat for water howellia or Ute's ladies'-tresses. There is no proposed treatment within or adjacent to potentially suitable habitat for water howellia. It was determined that implementation of any alternative would have no effect on water howellia or Ute ladies'-tresses or their habitat.

The Spalding's catchfly (*Silene spaldingii)* has recently been listed as threatened for the Idaho Panhandle National Forests. Its potential habitat is in grasslands in dry forest types. No occurrences are documented for the Coeur d'Alene River District. The closest occurrences to the project area are approximately 65 miles west in Spokane County. The Missouri Heli Bug project area does not contain suitable habitat for Spaulding's catchfly.

There are no Federally listed endangered plants for the Idaho Panhandle National Forests.

Mitigation measures and features that avoid disturbances to sensitive plant populations are discussed in Chapter 2. While some sensitive plant individuals may be impacted, implementation of projects on National Forest System lands, cumulatively, constitute insignificant impacts to sensitive plant populations or suitable habitat. Refer to Appendix C and the Project Files (TES Plants) for supporting information.

Noxious Weeds

While existing infestations of certain weed species may continue to increase on Federal lands and adjacent private lands, features of the action alternatives would serve to minimize (but not eliminate) the risk of weed

spread. Please refer to the "Features Common to All Action Alternatives" discussion in this chapter and the Project Files (Noxious Weeds) for supporting information. Weed treatment will occur in compliance with the Coeur d'Alene River Ranger District Noxious Weed Environmental Impact Statement and Record of Decision (USDA Forest Service, 2000).

Air Quality

Because use of prescribed fire would be based on smoke management guidelines, current air quality standards would not be exceeded under either action alternative. Over the long term, prescribed fire may reduce total particulates by reducing the risk of large wildfires that cannot be managed for emissions.

Soils

Alternative development was based in part on the "Soils Guidelines for NEPA Analysis" (Niehoff, 1998). The guidelines helped to determine soil management issues for environmental analysis of alternatives, prepare resource management prescriptions, and identify areas that would require on-site evaluation of proposed management activities. Soils data was used to:

- identify location of timber harvest and regeneration activities
- analyze potential sediment delivery impacts
- analyze potential depletion of key nutrients

To minimize erosion and ensure compliance with State water quality standards, all timber harvest associated with the Missouri Heli Bug project would be completed using Best Management Practices. Slash treatments will be modified as necessary to minimize loss of nutrients in potassium limited soils. All proposed harvest units are initial entries and meet Forest Plan Soil Quality Standards before and after treatment. The combined average unit soil disturbance for the proposed harvest activities is 1.14% under alternative 2 and 1.5% under alternative 3. The highest level in an individual unit is 10% associated with the tractor skidding of unit 7 in both alternatives. For additional information, please refer to the soil productivity analysis in the Project Files (Soils). Maps related to soil conditions and additional soils analysis are also provided in the Project Files (Soils).

Heritage Resources

Known sites containing important cultural resources were previously assessed under the Missouri Carpenter Planning Unit Report #89-IP-1-23 for their historical value and will be protected as appropriate. The 11 activity areas proposed of the Missouri Heli Bug project will not affect any known heritage resource sites. Any future discovery of cultural resource sites would be inventoried, and protected if found to be of cultural significance. Decisions to avoid, protect, or mitigate inpacts to these sites is in accordance with the National Historic Preservation Act of 1966.

Grazing Allotments

Ongoing grazing allotment projects are identified in Table II-5. The proposed activities would have very little effect, if any, on the movement or management of cows, based on the location of and use within this allotment. An environmental assessment concerning management of the allotments has been initiated and is expected to be completed in mid-2001.

Transportation Planning

The transportation planning for this EA is tiered to the Forest Plan, but has a higher degree of specificity. The goals for transportation facilities in Chapter II of the Forest Plan state in part:

> *Construct the minimum number of roads necessary to permit the efficient removal of timber and mineral resources. Construct and reconstruct roads only to minimum standards necessary to prevent soil loss, maintain water quality, minimize safety hazards for a reasonable and prudent Forest user, and provide access for fire protection where needed to meet management area goals.*

The existing roads coverage was developed from the geographic information systems (GIS) roads layer for the Coeur d'Alene River Ranger District. The project area encompasses a total of approximately 937 acres of National Forest System land. Within this project area are approximately 6 miles of road (this includes both system and nonsystem roads). Most of the nonsystem roads in this area are grown over to the point that they are no longer usable and hydrologically inert. Approximately 4.2 miles of forest roads would be used to yard and haul timber.

Roads used to yard and haul timber are either main arterial system roads open to the general public for recreational use and general forest access, or gated to reduce public access but maintained for winter recreational usage. These roads which are used by the public would be maintained for travel in a standard passenger (Maintenance Level 3). These roads would be maintained for low speed and would be single lane with turnouts and spot surfacing.

This proposal seeks to treat areas of low, live, overstory stocking levels using the existing transporation system that is in place. No new construction or reconstruction will occur. This approach, though not as economical as constructing direct access to these areas, avoids ground impacts associated with roading.

The management of each road in a maintenance level 3 status remains the same regardless of the alternative that is selected.

Due to the small amount of existing roads, the recently upgraded condition of these roads, and the absence of new road construction or reconstruction, there was no need to do a thorough roads analysis under the Roads Analysis Policy for this project area. Road upgrades, channel site upgrades, and obliterations were completed throught the Capitol Hill Resource Project Area plan. The Coeur d'Alene River Ranger District Access Management Assessment (USDA Forest Service, 2000) was used to determine system roads within the planning area.

Public Safety

Proposed activities would be accomplished utilizing safety standards based on the Forest Service's Health and Safety Code Handbook (FSH 6709.11). The timber sale contract would contain safety provisions C6.33 – Safety, C6.331 – Safety (Helicopter Operations), and C6.332 – Safety (Timber Hauling). These provisions require development and implementation of a traffic control plan and other safety requirements.

Social Values

The Coeur d'Alene River Ranger District currently provides a wide range of economic, recreational, hydrologic, aesthetic and scenic values. These values are present in the areas being considered for treatment under this project. Higher fuel loads associated with concentrations of dead and damaged timber present an increase in fire hazard potential putting all these values at risk. Hillslopes with a high component of dead timber are also often not considered as very aesthetically pleasing to the general public.

Trees killed by the Douglas-fir beetle lose a portion of their value as sawtimber each year they remain unharvested (Douglas-fir Beetle Project EIS, June 1999; page I-10). A large portion of the trees being considered for removal under this project were killed by bark beetles in 1999 or 2000. Based on reports from

timber sale purchasers, sale administration, and local mills, timber being removed under the Douglas-fir Beetle Project is running 20-30 percent defective. This is primarily associated with sapwood defect as a result of a rot fungus brought in by the beetle. The timber removed under this project would have similar defect percentages. It is important this timber be removed as quickly as possible to provide for the greatest opportunity for long-term vegetative restoration within the affected areas and for economic benefits to local communities.

The National Forest System is designed to provide for multiple uses and values. It is not the intent to achieve this on every acre but to provide for a diverse range scattered across the forest landscape. The forest is a dynamic system. It is in a constant state of change though often not very well perceived in human time frames. It is often desirable from a social value standpoint to bring about change gradually in the landscape and to change small areas of the landscape. By reducing the amount of dead and damage timber, fire intensities can be reduced to levels that may allow for initial attack forces to control a fire before it brings about significant change to the visual landscape.

Salvage of wood fiber from beetle-killed trees provides jobs and income to local communities. The demand for timber products is real and is increasing with increasing populations. It is desirable to salvage dead and dying timber to help meet some of the demand so that there is less pressure to harvest green trees. It is also environmentally wise to grow more trees and use more wood as a substitue for non-renewable fossil fuels and materials such as steel, concrete, and plastics (Moore –Greenspirit speech). Salvaging this timber does not come without some disturbance or interruptions to the other social values and services the forest is providing, but these disturbances are of a temporary nature. Recreational experiences may have to be achieved in another area of the forest setting until activities are completed. However, salvage of this material does provide for a funding source for road maintenance on roads used by the recreational public.

There are social values associated with each of the resources and issues analyzed in this assessment.

Recreation

Recreation goals and objectives identified in the Forest Plan are to provide for the projected use of developed recreation areas with development of new sites as budget becomes available, to provide for a variety of dispersed recreation opportunities, to pursue opportunities to increase and improve the recreation trail system, and to continue to increase cooperative trail programs with organizations, clubs and other public agencies. The following standards were established by the Forest Plan in compliance with the NFMA:

- *Recreation Standard 1: Continue to provide a share of recreation opportunities*
- *Recreation Standard 7: Provide a broad spectrum of dispersed and developed recreation opportunities*
- *Recreation Standard 8: Treat and maintain timber stands in a manner compatible with recreation objectives*
- *Recreation Standard 10: Trails will be managed in accordance with management area requirements*

The Multiple Use Act of June 1960 establishes recreation to be administered as a resource equal in value to timber, watersheds, wildlife and fish, and range. The Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin, and Coeur d'Alene Geographic Assessment:

- Establishes the Recreation Opportunity Spectrum as a guide to meet recreation goals.
- Defines geographic importance of places for recreation opportunities and facilities.
- Directs that opportunities to extend expand and protect recreation facilities be explored in planning documentation.
- Identifies existing recreation facilities and sites and areas of concentrated recreation use.

Guidance for management of recreation resources is provided in various National Forest manuals and handbooks, as well as professional publications and documents.

Proposed harvest units lie in an area where there are no recreation developments or known dispersed (undeveloped) camping or picnicking sites. Under the Recreation Opportunity Spectrum (ROS), the affected area is classified as roaded and modified in appearance.

The Scott Gulch trail used mainly during hunting season lies partially on the southern border of the project area. This project will have no effect on the recreational use of this trail except for some short term disturbances of noise from the proposed harvest activities.

Alternatives 2 and 3 would have no more than short-term disruptive effects. The Missouri Heli Bug project would likely only last over a period of one to three months. Visitors may also encounter sights and sounds of various timber management operations along with short delays on the open #933 road during felling and yarding activities. Timber operations would be compatible with a Recreation Opportunity Spectrum, (ROS) classification of (roaded modified).

Log hauling on road #933 would be prohibited on weekends and holidays when more recreational traffic is occurring on these roadways. There remainder of the haul routes are on two lane paved county roads and would not be restricted.

Logging operations would be prohibited during the winter recreational period of 12/1 to 3/31 on the gated portion of the #933 road since it is part of a groomed snowmobile route within the Browns Ridge, Capitol Hill National Recreation Snowmobile Trail.

Combined, this project and the ongoing and foreseeable activities listed in Chapter II will not alter the Coeur d'Alene River Basin ROS because they are all small in scope and duration. These projects will have only transitory effects on recreation access and opportunities.

Various harvest and post harvest activities could temporarily displace some recreation visitors to other parts of the Coeur d'Alene River District.

The Access Management Travel Plan will have a more wide-ranging and longer duration effects. Implementation of the new travel plan will still provide the recreational spectrum identified under the Forest Plan but will provide more direction to the public on road usage. In general, the new travel plan will be more restrictive and reduce motorized recreational access. Within the project area, the Access travel plan is generally similar to the existing situations with barriers on most of the side roads.

No developed recreation sites will be directly affected.

Scenery

Scenery management direction is provided by the Forest Plan and is described in terms of Visual Quality Objectives. The objectives are based on the area seen from sensitive travel corridors and on other features that result in a high visual sensitivity level. The visual management system was revised in 1995, and is now known as the Scenery Management System. The revised guidelines are provided in "Landscape Aesthetics: A Handbook for Scenery Management," (USDA Forest Service, 1995

This area lies astride Beaver Creek, the bottomlands of which are mostly in private ownership. The residences in Beaver Creek live in a rural environment that has been modified visually to allow agricultural pursuits to be maintained. The slopes above the rural valley are heavily forested and in places past harvest activity is

evident. The road along Beaver Creek is a primary access from Wallace to Coeur d'Alene River recreation sites. Visual sensitivity is considered to be moderately high from the county road and from residential sites along Beaver Creek.

Alternative one would have little effect to the scenery in the valley, though fires could change that over time. Alternative 1 would not change the scenic conditions here except that large numbers of dead trees might be noticed. Alternative 2, with retention of groups and individuals of large green trees in regeneration units will meet the VQO's from the county road #456 as middle and background landscape. The #456 road has a visual sensitivity level of 2. This sensitivity level requires partial retention in the foreground and modification in the middle and background. Extra care should be taken in the site preparation burning of unit 68. This unit is within the background viewshed of the #456 county road. Retention of a green overstory canopy in this unit will be necessary to minimize visual effects of treatment. Alternative 3, units 6 and 8 will treat a smaller portion of this hillside and the same care as listed above should be taken. Treatments proposed for each unit, would meet partial retention and modification objectives from all viewpoints.

Activities listed as ongoing and foreseeable in Chapter II would have no effect on visual quality. Past activities and beetle mortality within Beaver Creek have created some of the variation in the landscape that would allow treatments proposed under the action alternatives to blend into the existing landscape.

The scenery resources consider cumulative effects at the Coeur d'Alene River Ranger District scale. The National Forest provides a wide range of scenic views scattered across the district. The ongoing and reasonably foreseeable projects identified in Chapter II fall within the wide range of natural variation. The alternatives under this project and other ongoing and foreseeable projects are designed to meet the Forest Paln visual quality objectives for the overall landscape.

Natural systems are dynamic and changing. Changes are usually subtle and occur over long periods of time. Occasionally changes are catastrophic reaping large-scale transformation of the scenic conditions of the landscape. Selection of this alternative does remove the threat of relatively small short-term changes in the visual character of the landscape but does not insure no change. Collectively the logging systems applied to the units in the alternatives have a negligible over all effect on the scenic character of this area of the Coeur d'Alene Basin. Past activities have created some variation in the landscape that would allow treatments proposed under the action alternatives to blend in with the existing landscape. The selected harvest of salvage units would not be visually apparent. The regeneration units, with scattering and groups of trees, to an extent mimic, what naturally occurring openings in tree cover which totally is in character with this ecosystem.

16 MAR 2001

Kootenai Environmental Alliance

P.O. Box 1598 Coeur d'Alene, ID 83816-1598

Joe Stringer, District Ranger
Coeur d'Alene River Ranger District
Fernan Office
Coeur d'Alene, ID 83814

March 15, 2001

Dear Mr. Stringer:

I am submitting the following concerns regarding 3 proposed timber sales described in the Feb 15, 2001 Forest Service scoping notices.

Burnt Cabin Heli Bug:
The document to be prepared for this timber sale needs to include a cumulative effects analysis. The CEA should indicate whether any of the planned 7 logging units are adjacent to or within ¼ mile of logging units associated with either the Barney Rubble's Cabin Salvage sale or any of the Douglas-fir Beetle timber sales. If there are logging units within the CEA area, the document should indicate the number of units that are present.

The document for this sale should include the current ECA for the project area and indicate the number of acres of clearcuts that are listed in the TSMRS for the project area. The document should also indicate if there is data in the project files that indicates the percent of trees that have been identified as dead, dying, and green in each of the 7 units.

Little Ucelly Bug:
The document to be prepared for this timber sale needs to include a cumulative effects analysis. The CEA should indicate whether units 1 thru 7 are adjacent to or within ¼ mile of logging units associated with the Prichard Peak timber sale. The document should also indicate the number of clearcut units that currently exist within this CEA area and indicate the number of acres of clearcuts that are listed in the TSMRS for Prichard Peak area.

There should also be a CEA for units 8 thru 11 that will indicate if any of these units are adjacent to or within ¼ mile of previous logging units in the Eagle Creek area.

The document for this timber sale should include the ECA for the Prichard Peak area and the ECA for the Eagle Creek area. The document should also indicate if there is data in the project files that indicates the percent of trees that have been identified as dead, dying, and green in each of the 11 units.

Watersheds/Fisheries/ECA's:
The watershed analysis should indicate the current watershed condition, Not Properly Functioning, Functioning at Risk, or Properly Functioning, for each watershed in each project area. The fisheries analysis should provide information regarding the status and trends of the fisheries in the Creeks in each of the project areas and indicate whether historical fisheries information exists for each of the project areas.
The watershed analysis should also include data for the existing Equivalent Clearcut Acres in each of the project areas. The analysis should include data regarding the total allowable ECA for each of the drainages in the four areas proposed for logging, and data indicating the estimated number of years needed for full vegetative recovery for the drainages in each project area.

Old Growth:
There should be information that will indicate whether logging would occur where there are stands of trees with a dbh > 15 inches. The Old Growth analysis should indicate whether there are field verified Old Growth stands within or adjacent to any of the project areas.
If there are field verified Old Growth stands that are within the boundaries of any of the project areas, and R1 edit data exists for the field verified Old Growth stands, R1 edit data that indicates the dbh and age of the trees in the stands should be included in the project files. The project files should also indicate the OGMU that covers each project area.
There should be data that would show the estimated number of acres of dead Douglas fir that would be logged in each project area.

Large Organic Debris/soils:
If field surveys have been conducted in any of the analysis areas that analyzed soil conditions where there are large downed Douglas fir trees, a summary of the survey results should be included in the project files.

Mitigation work:
If there has been road or instream work performed after 1990 in any of the project areas that was a requirement included in NEPA analysis for timber sales, including Big Short Salvage, the EA should describe the mitigation work completed.

The comments are also being submitted on behalf of Ron Mitchell, Idaho Sporting Congress, P.O. Box 1136, Boise, ID 83701. We wish to receive a copy of the EA and request a copy be sent to Ron Mitchell, Idaho Sporting Congress.

Sincerely,

Mike Mihelich Forest Watch Coordinator

Response to comments provided by Mike Mihelich, Kootenai Environmental Alliance

1. A cumulative effects analysis was conducted for each of the affected resources (Chapter 3). The cumulative effects analysis included past, ongoing and reasonably foreseeable activities, including harvest treatments (Chapter 2). There are no previous harvest units immediately adjacent to proposed treatment areas. There are several proposed treatment units that are within ¼ mile of previous harvest areas. The Project Files (Vegetation) include information regarding locations of past harvest treatments within the project area.

2. The environmental assessment does include the current equivalent clearcut acres (ECA's) for the watershed analysis area (Table 3-7). The Equivalent Clearcut Acre figure includes more than existing clearcuts; it also includes partial canopy reductions from other harvest activities that are converted into clearcut acres. The Project Files (Vegetation) identifies the number of clearcut acres in the project area (tracked in the TSMRS data base), and when the harvests occurred. The Project Files also contain information concerning the green canopy component within the activity areas before and after treatment (by alternative).

3. As discussed in Chapter 3 (Watershed Resources), the Beaver Creek watershed is classified as Not Properly Functioning. The assessment discusses the cumulative effects of the proposed alternatives.

4. As described in Chapter 2 (Monitoring), the Ecosystem Team for the Idaho Panhandle National Forests has developed a Forest Corporate Monitoring system to track our progress in restoring the ecosystems of the Idaho Panhandle and in being more consistent in the way we analysis effects to the ecosystems. The monitoring is tied closely to findings of the Interior Columbia Basin and Coeur d'Alene Basin Geographic Assessment. Results of Forest level monitoring are published in an annual report; the report is available from the Supervisor's Office of the Idaho Panhandle National Forests, in Coeur d'Alene, Idaho.

   Timber sales are monitored throughout the life of the sale through timber sale administration to ensure implementation is consistent with project design. Post harvest reviews are conducted on a sampling of the sales to monitor if desired end results were achieved. Regeneration units are surveyed to monitor success of reforestation efforts. If used by the specialists in the analysis process, the written evaluations are referenced within the appropriate sections of Chapter 3.

21 MAR 2001

The Ecology Center, Inc.
801 Sherwood Street, Suite B
Missoula, MT 59802
(406) 728-5733
(406) 728-9432 fax
ecocenter@wildrockies.org

(Provided via e-mail on 3/19/01 and via first class mail)

March 19, 2001

Jose Castro, Acting District Ranger
Coeur d'Alene River Ranger District
2502 East Sherman Avenue
Coeur d'Alene, Idaho 83814

Mr. Castro;

These are comments on the Missouri Bug project proposal (your February 15, 2001 scoping letter), on behalf of the Ecology Center, the Lands Council, and Alliance for the Wild Rockies.

The scoping letter states, "The proposed activities are outside of the analysis area considered under the Douglas-fir Beetle or Small Sales EIS projects." This is clearly a disingenuous statement. Although the Missouri Bug project does not fall within the arbitrary "Analysis Area" boundaries drawn for the Douglas-fir Beetle (DFB) Project, the Missouri Bug project logging would occur immediately across Beaver Creek from areas that were designated for extensive logging in the "Hart Analysis Area" (DFB ROD, CDA Map 3 Area, Selected Alternative). As some of our comments on both the DFB and Small Sales (SS) project were in regards to cumulative effects on aquatic resources downstream of immediate logging activities, and given the relative locations of all these projects, the cumulative effects of all must be analyzed together.

The proposal is more expansion of the Coeur d'Alene River Ranger District's portion of the Douglas-fir Beetle (DBF) project. It seems the IPNF is trying to avoid NEPA's requirement to fully analyze impacts of the combined actions. We incorporate our comments and appeals of the DFB Project and SS project as comments on the Missouri Bug project. We also incorporate the Ecology Center's January 25, 2000 letter to the Forest Supervisor, which the Coeur d'Alene River District Ranger received a copy, as comments on this proposal. Please place a copy of those documents in the Project File as responsive to your request for comments on the Missouri Bug project.

This proposal also continues the IPNF's "management by crisis" which, like the DFB and SS projects, is an overblown reaction to an infestation of a native insect species—one that has been periodically infesting the forest without ill-effects for centuries. The present condition of the Forest follows from decades of overcutting and excessive road building to the point that the only "justification" for more logging is to perpetrate a "forest health" concern so an increasingly skeptical public can be temporarily confused into submission.

Our observations of many cutting units of the DFB sale revealed that the extensive cutting of healthy trees was the result, far more than stated in the DFB FEIS. We suspect that the proposed project would also result in more highgrading of large live and dead trees. Live or dead, standing or fallen, these provide important habitat components of many sensitive, endangered, threatened, and management indicator species, and contribute to development of diverse mature and old growth forests and contribute to habitat connectivity of species depending on old growth.

The extreme importance of old growth forests can be understood by its conceptualization as representative of the biological diversity in largely unmanaged, native forests. In his January 8, 2001 speech, Chief Dombeck provided guidance for the retention of remnant old growth:

> In the not-so-distant past, old trees were viewed as "overmature" or "decadent" and targeted for cutting because of their high economic values. Today, national forests contain our last remaining sizable blocks of old-growth forest—a remnant of America's original landscape. In the future, we will celebrate the fact that national forests serve as a reservoir for our last remaining old growth forests and their associated ecological and social values.
>
> In the future, the Forest Service will manage old-growth forests specifically to maintain and enhance old-growth values and characteristics. We will develop manual direction that directs individual forests to:
>
> - Inventory and map remaining old-growth forests;
> - Protect, sustain and enhance existing old-growth forests as an element of ecosystem diversity;
> - Plan for old-growth within a landscape context, extending beyond forest boundaries;
> - Determine the extent, pattern and character of old-growth in the past—prior to European contact and, potentially, at the time the area entered the National Forest System; and
> - Project forward in time the amount, location and patterns of old-growth envisioned under alternative management options.

The *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (hereafter, *Scientific Assessment)* recognizes the importance of maintaining large, old trees and the loss of big trees in Columbia Basin from logging. From the *Scientific Assessment:*

> There has been a 27 percent decline in multi-layer and 60 percent decline in single-layer old-forest structures, predominantly in forest types used commercially. (P. 181.)
>
> Throughout most forested Ecological Reporting Areas (ERUs), native herblands, shrublands, and old multi-layered sand single-layered forests have declined substantially in area and connectivity since the Basin was first settled by European-Americans. (P. 60.)

> Forest composition and structures have largely become more homogeneous. At the same time that late-seral structures have been declining, early-seral structures have also been declining. These structures have been replaced to a substantial degree with mid-seral structures, resulting in homogeneous forest structures. Although early-seral forests of shade-intolerant species have been fragmented, late-seral shade-tolerant forests have grown more contiguous. Consequently, many forest landscapes are now more homogeneous. (P. ?)
>
> Where harvest has removed the long-interval, late-seral, multiple-layer forests, ecosystem management would actively promote restoration for rapid growth of similar structures. Wildlife species associated with these late-seral forests are cavity excavators and those with large home ranges. (P. 169.)
>
> Removal of these trees (residual large live trees) resulted in conversion of the seed source from shade-intolerant species to shade-tolerant fire-, insect-, and disease-susceptible species, as well as losing the diverse structure. Harvest of the large live or dead residual trees from these types results in the loss of important habitats as well as components in long-term nutrient cycles. Management practices can promote the maintenance of these large residual trees where they exist and where they have been harvested or otherwise lost, management can focus on rapid growth of selected young trees with similar characteristics. (P. ?)
>
> We found that salvage activities could contribute to the achievement of long-term ecological integrity by emphasizing prevention of insect and disease outbreaks rather than focusing on the removal of large recently dead trees. (P. 16.)
>
> (S)alvage emphasizes the extraction of specified volumes of dead and green trees at risk of dying. As such, harvest will emphasize larger trees, both green and recent dead, of desirable species ... Our findings suggest that this type of harvesting is not compatible with contemporary ecosystem-based management. (P. 178.)
>
> Emerging Science Issues: We had not anticipated the data indicating the extensive loss of large trees in the landscapes over much of the Basin. The harvest legacy has been more extensive than we thought. (P. 180.)
>
> Management outside the reserve boundaries includes an emphasis on conserving remaining old forest stands and roadless areas larger than 1000 acres (405 ha). (P. 140.)

The *Scientific Assessment* makes it clear that the proposed removal of large trees is out of step with the latest scientific thinking regarding the maintenance of old growth and addressing the rarity of large, old trees on the landscape. The landscape in and around the proposal area has been extensively logged and roaded, leading to the

simplification of what was a very diverse forest ecosystem. NEPA at 40 CFR § 1502.24 states. "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." And at 40 CFR § 1500.1(b) (E)nvironmental information ... must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA."

The area within and around the Missouri Bug project proposal has been extensively logged and roaded, contributing to cumulative impacts in Beaver Creek and the North Fork Coeur d'Alene River. We request that you prioritize restoration rather than invest more taxpayer money in another ill-conceived logging project.

Thank you for considering these comments. Please keep each group on the list to receive all future communications regarding this proposal.

Sincerely,

Jeff Juel

and on behalf of:

Mike Petersen
The Lands Council
517 S. Division
Spokane, WA 99202
(509) 775-2590

Mike Wood
Alliance for the Wild Rockies
P.O. Box 8731
Missoula, Montana 59807
(406) 542-0050

4

Response to comments provided by Jeff Juel, Ecology Center

1. The cumulative effects analysis for this project considered effects of past, ongoing and reasonably foreseeable activities. Ongoing and reasonably foreseeable activities are identified in Chapter II. Past activities are described in the existing condition discussions in Chapter III, with additional past harvest information in the Project Files (Vegetation). The area considered for each cumulative assessment is based on the affected resource. The cumulative effects analysis area for watershed resources and fisheries extends from the headwaters of Beaver Creek to the confluence with the North Fork Coeur d'Alene River (Chapter 3, Watershed Resources, "Direct, Indirect and Cumulative Effects at the Watershed Scale,"and Fisheries, "Methodology"). The cumulative effects to the aquatics resources from the Douglas-fir Beetle Project, the Small Sales EIS, and this project are analyzed together (Chapter III, Watershed Resources, "Cumulative Effects").

   The Missouri Heli Bug project is a result of the expansion of beetle mortality as a result of subsequent beetle flights. There is no way we could have considered it under the Douglas-fir Beetle assessment because it was outside of the Douglas-fir Beetle analysis areas, and the mortality had not occurred at that time. This Missouri Heli Bug Environmental Assessment has fully analyzed the cumulative impacts of this proposal with full consideration of ongoing and foreseeable activities in and around the project area.

2. The Environmental Impact Statements for the Douglas-fir Beetle and Coeur d'Alene River Ranger District Small Sales Projects addressed different proposals at different levels of scope in different geographic locations. In comments on numerous other project-level proposals, Mr. Juel has requested that we incorporate his letters to the Forest Supervisor regarding his desires for management of the National Forest. We have consistently responded that such an approach to public comment is insufficient and does not meet the requirements for commenting on Forest Service proposals, which requires "specific facts or comments along with supporting reasons that the person believes the Responsible Official should consider in reaching a decision" (36 CFR 214.5[b]). Mr. Juel was advised that many of the concerns he raised in his January 25, 2000 letter are more appropriately addressed at the Forest Plan scale or at even a more broad scale (letter to Jeff Juel from former Forest Supervisor David Wright, dated February 11, 2000). Mr. Juel has been asked to respond as specifically as possible to project-level proposals.

3. This environmental assessment is a response to a change in stand conditions as a result of bark beetle and root disease mortality. It is not management by crisis, but it is a project that warrants urgency if it is going to be implemented. Loss of timber value is occurring. If the decision is to proceed with the salvage of this material it must be completed in a timely manner. Public comments related to the Douglas-fir Beetle EIS suggest that a significant portion of the public thinks it is important to utilize dead and dying timber for commodity production and to reduce long-term fuel loadings.

4. There is no disputing the importance of true old growth forests and their associated ecological and social values and of the direction stated in the comment letter to protect, sustain, and enhance existing old-growth forests as an element of ecosystem diversity. This project does not propose any entry or enhancement treatments for stands being managed for old growth habitat.

5. The proposed treatments under the Missouri Heli Bug project are consistent with the Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin. This project does not propose to remove late-seral residual large stand structure. The proposal is entering even-aged, shade-tolerant, homogeneous type stands which the assessment says we have far too much of as compared to historic and ecologically sound conditions. Based on the TSMRS database, the majority of the proposed treatments are in immature sawtimber (stands that are 100 years of age or less).

   The proposed treatments would not remove any late-seral structure such as large pines or larch. Any of this late seral structure, live or dead, would remain on site. In the Missouri Heli Bug location there is

widely scattered, mid-sized larch but there is very little ponderosa pine. Larch of any size that would survive an underburn will be retained. In addition, the larger Douglas-fir and grand fir that are live and healthy will remain on site. Even though these trees are not the shade-intolerant seral species referred to in the Interior Columbia Basin Assessment, this will retain a larger tree component on site, with the potential to become residual old forest structure in the future. Two to four of the largest dead trees per acre will also be retain on site for habitat for snag dependant species.

With Missouri Heli Bug, the proposed group shelterwood harvests with underplanting to pines and larch will create a multi-layered stand characteristic and will increase early-seral structure, which has been identified by the Geographic Assessment as a component that is declining.

6. The proposed action for the Missouri Heli Bug project is a vegetative restoration project designed to re-establish the vegetation components that Mr. Juel is calling for in his comments. The activities proposed under the action alternatives are consistent with the Forest Plan and other applicable regulatory direction (Chapter 3, Forest Vegetation). A watershed restoration-only alternative was considered but dismissed from further study because it would not address any of the issues identified in the purpose and need for this project (Chapter 2, page 9). Similarly, a vegetative restoration alternative that did not include recovery of the economic value of the dead and diseased timber would not meet the purpose and need.

Southeastern Regional Office
P.O. Box 276268
Boca Raton, FL 33427-6268
561.347.0949

Jose Castro
Idaho Panhandle National Forest
Coeur d'Alene River Ranger District
P.O. Box 14
Silverton, ID 83867

March 7, 2001

Re: FCC and NFPA Scoping Comments on Missouri Bug Salvage Sale

Dear Mr. Castro,

We intend this letter to be an expression of our interest in the Missouri Bug Salvage Sale. In addition, our organizations (Forest Conservation Council [FCC] and the National Forest Protection Alliance [NFPA]) would like to raise several issues concerning the project that should be addressed in subsequent environmental documentation. In general, 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 processes that are vital to ecosystem sustainability, and degrade water quality and watershed condition. Further, the project will damage social and economic uses and values associated with natural forests (including forests that are affected by beneficial natural disturbance) for the benefit of the timber industry, even though non-timber uses and values are far more important to local communities and the regional economy.

More specifically, 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. The Forest Service's failure to quantify such effects at the project level or for the logging program as a whole is contrary to many federal and USFS regulations. 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. 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 includes employment and income (including multipliers) associated with non-timber uses.

This is not exclusively a "timber economics" issue. Certainly, we are concerned with the financial efficiency of the Missouri Bug Salvage Sale, the so-called "below cost" or "deficit sale" issue. However, our concerns go beyond this issue to include the economic efficiency of the timber sale, whether or not the costs and benefits, beyond those to the federal government, meet the government mandate of net public benefit. 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?

Over

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. For many of these species, 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 Missouri Bug Salvage Sale will maintain numbers and distribution of these species sufficient for insuring long term viability.

It is essential that the analysis include an in depth treatment of cumulative effects especially in regards to soils, water quality, fragmentation, old growth, TES, MIS, and neotropical migrant birds. All activities including past, present, and reasonably foreseeable future activities on each and every land ownership must be incorporated.

Finally, we request that a no-harvest, restoration only alternative, one 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. 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. Such a no-harvest, restoration alternative **is not** analogous to the no-action alternative.

Please consider these issues as you further develop environmental documentation related to the Missouri Bug Salvage Sale. All further NEPA materials should be mailed to the address above. **Please remove our Western Office and John Talberth from your mailing list. Any combination of John Talberth, Forest Guardians, or Forest Conservation Council, P.O. Box 22488, Santa Fe, NM 87502 should be removed.**

Sincerely,

Bryan Bird
Southeastern Regional Office

FCC/NFPA Scoping Comments, Missouri Bug Salvage Sale, p. 2

Response to comments from Bryan Bird, Forest Conservation Council

1. In the case of this project, timber harvest is a management tool, being proposed as a means to create conditions necessary to rehabilitate a declining forest. The Forest Service management policy is based on multiple use of the forest resource. Federal Code of Regulations (36 CFR 221.3) directs that management plans for national forest timber resources will be designed to aid in providing a continuous supply of national forest timber, be based on sustained yield, provide and even flow of timber in order to facilitate the stabilization of communities and employment, and be coordinated with other uses of national forest lands in accordance with the principles of multiple use management. We look at trying to achieve a blend of resource and wildlife habitat needs consistent with public expectations and desires for the National Forest.

   The human presence in the forest over the last 100 years has affected forest ecosystems. Road building, timber harvest, riparian usage, fire suppression, introductions of pathogens such as white pine blister rust have all had an effect on the existing forest ecosystem. Not all forest ecosystems are currently healthy and not all ecosystem health can be restored by just walking away. Some of the natural ecosystem disturbance processes of the past are not as acceptable now with the human presence in the forest and with the various expectations of what the forest should provide.

2. We maintain the viability of wildlife species by ensuring that we maintain various habitats for these species. It is not possible to provide habitat for every given species on every acre at any given moment in time. This habitat is dispersed across the forest. The wildlife analysis for the Missouri Heli Bug proposal considered effects to species with habitat within the analysis area. A comparison of effects to wildlife under each alternative is provided in Chapter 2). This included black-backed woodpecker, fisher, Northern goshawk, and elk (for further information regarding species not discussed, please refer to the "Issues Not Addressed in Detail in this Environmental Assessment" discussion in this Appendix).

3. The cumulative effects analysis for this project considered effects of past, ongoing and reasonably foreseeable activities. Ongoing and reasonably foreseeable activities are identified in Chapter II. Past activities are described in the existing condition discussions in Chapter III, with additional past harvest information in the Project Files (Vegetation). The area considered for each cumulative assessment is based on the affected resource. The analyses focused on issues considered as factors in the decision to be made. This is consistent with NEPA direction to focus on a full and fair discussion of significant issues, and to identify and eliminate from detailed study the issues that are not significant (40 CFR 1501.7). Issues not addressed in detail in this Environmental Assessment are discussed briefly earlier in this Appendix.

4. The proposed action is a restoration alternative. In order to restore the vegetative component of the area, pines and larch need to be reintroduced back into the ecosystem. In this case, we believe the most efficient and reasonable means is through a "light on the land" timber harvest followed by introduction of fire and planting to bring the area back to more historic conditions. We are making an investment into the future ecosystem and its sustainability. Could this be done without commercial logging? Yes. But considering the diverse needs and desires of the public, that would not be a reasonable or efficient way to achieve that goal. Timber harvest is a way to reduce fuel loads, create conditions to allow for establishment of pines and larch, and help finance the vegetative restoration process.

   The activities proposed under the action alternatives are consistent with the Forest Plan and other applicable regulatory direction (Chapter 3, Forest Vegetation). A watershed restoration-only alternative was considered but dismissed from further study because it would not address any of the issues identified in the purpose and need for this project (Chapter 2, page 9). Similarly, a vegetative restoration alternative that did not include recovery of the economic value of the dead and diseased timber would not meet the purpose and need.

APPENDIX B
RARE PLANTS

B.1. Regulatory Framework

Federal legislation, regulations, policy and direction that require protection of species and population viability, evaluation and planning process consideration of threatened, endangered and other rare (Forest Service "sensitive") plants species include the Endangered Species Act (1973) as amended; the National Forest Management Act (1976); the National Environmental Policy Act (1969); Forest Service manual (2672.1-2672.43); Idaho Panhandle National Forests, Forest Plan (1987); and direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants program and Washington Office.

B.2. Methodology

Assessment of the affected environment for sensitive species, Forest species of concern and suitable habitat occurrence was accomplished through review of the Coeur d'Alene River Ranger District sensitive plant records, Idaho Department of Fish and Game Conservation Data Center (ICDC 1999) element occurrence records, National Wetlands Inventory maps, timber stand examination records, aerial photographs and topographical maps, past field visits, personal knowledge and professional judgement of the project area by the District Botanist.

Analysis of effects was conducted using results of past sensitive plant surveys, current distribution and condition of sensitive plant species in habitats similar to those found in the proposed treatment sites, types of proposed treatments and the likely effects to existing populations and habitat from the proposed activity based on current knowledge and professional judgment. It included a broad-scale assessment (see Project Files – TES Plants) of the distribution and suitability of sensitive plant habitat in relation to proposed activities and a detailed analysis of each proposed activity and the need for mitigation. The analysis considered cumulative effects, as well as the effectiveness of mitigation proposed for the protection of species. The cumulative effects analysis area for TES plants was the vegetative analysis or project boundary.

Effects to sensitive plant species or suitable habitat from proposed activities are generally described as very low, low, moderate or high, with the following definitions:

- Very low: no measurable effect on individuals, populations or habitat
- Low: individuals, populations and/or habitat not likely affected
- Moderate: individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level which could support sensitive plant species
- High: populations may be affected and/or habitat capability may over the long term be reduced below a level which could support sensitive plant species

Effects to population viability from disturbance events (natural or man-caused) are difficult to quantify with certainty for all sensitive plant species and species of concern. Specific knowledge of population ecology is lacking for several species addressed in this analysis, particularly the sensitive moonworts and certain orchid species: round-leaved rein orchid and phantom orchid. Much of the current knowledge regarding sensitive plant species is based on observational and even anecdotal information. Recent literature and monitoring reports on several species, including: deerfern (Blake and Ebrahimi 1992), clustered ladies slipper (Greenlee 1997), Henderson's sedge and Constance's bittercress (Lichthardt 1998) and Idaho strawberry (Crawford

1980), provide a greater understanding of the relationship of habitat disturbance to the integrity of populations of these species.

As a beginning point, on habitats that are currently unsurveyed for plants, presence of the appropriate species is assumed. Protection of known large occurrences, and protection of contiguous, unoccupied highly suitable habitat is assumed to be an effective conservation strategy. The Features Common to All Action Alternatives section of Chapter II explains that populations would be protected, although some isolated individuals may be impacted by activities. Surveys will be conducted to ascertain the presence of Sensitive plants, prior to ground-disturbing activities. Mitigation measures will be designed by the project botanist to ensure populations are protected. Without mitigation, there exists a high likelihood of adverse effects to sensitive plants in highly suitable habitat, especially from moderate to high risk activities such as regeneration harvest, commercial thinning using tractor or skyline methods, road construction, fuel break construction, full road obliteration (return to contour), and fuels reduction (underburning and mechanical treatment). These effects could lead to loss of population viability, or trend toward Federal listing, especially for plant species in the moist, dry and wet guilds**.**

Sensitive Plant Surveys

Sensitive plant surveys were completed for the Missouri Heli Bug project in August of 2001in areas of high potential habitat. No sensitive or T&E plants were found. Specific features of the alternatives (Chapter II, Features Common to All Action Alternatives) would be implemented to protect any newly documented population and its habitat that is discovered prior to or during project implementation.

Indicators used to measure effects on sensitive plants and suitable habitat include: predicted canopy reduction, because light and moisture regimes may change; the extent of each proposed activity, such as amount of ground disturbance, because mechanical disturbance can disrupt and destroy growing plants and regeneration potential; proximity of known sensitive plant occurrences because this indicates a high likelihood of plants being present; and the predicted reduction of heavy fuel loads, because fires can disrupt and destroy growing plants and their methods of reproduction.

For certain species, moderate to low risk activities such as selective harvest, low intensity fire, and road reconstruction are not likely to adversely affect population viability, even though individual plants may be affected. Observations and monitoring information indicate that some activities may have little effect or even a positive effect on species tolerant of low to moderate levels of disturbance, such as deerfern (Blake and Ebrahimi 1992), Idaho strawberry and Constance's bittercress (Crawford 1980).

Refer to Project Files (TES Plants) for a comparison of the relative risks of various types of activities with respect to sensitive plants and habitat.

B.3. Affected Environment

Threatened and Endangered Plant Species

A threatened species, as determined by the US Fish and Wildlife Service, is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Currently, the US Fish and Wildlife Service (USDI 1999) list two species as threatened for the Idaho Panhandle National Forests, water howellia (*Howellia aquatilis*) and Ute ladies'-tresses (*Spiranthes diluvialis*). There are no documented occurrences of these species on the Idaho Panhandle National Forests, although suitable habitat is suspected to occur. The recent Douglas-fir beetle outbreak has not affected suitable habitat for water howellia or Ute's ladies'-tresses. There is no proposed treatment within or adjacent to potentially suitable habitat for water howellia. It was determined that implementation of any alternative

would have no effect on water howellia or Ute ladies'-tresses or their habitat. Refer to the Biological Assessment in the project file for more information on water howellia and Ute ladies'-tresses.

Spalding's catchfly (*Silene spaldingii*) is suspected to occur on the IPNF and was recently listed as a threatened species for the Forest. Spalding's catchfly habitat was determined using Timber Stand Database information, satellite imagery landtype classification (SILC), aerial photography, and field survey. Suitable habitat consists of grasslands dominated by Idaho fescue (*Festuca idahoensis*) or rough fescur (*F. scabrella*). Sites typically have few to no shrubs and only scattered individual ponderosa pine and Douglas-fir trees. Soils generally range from moderately deep to deep (USDA, 2000). Potential habitat within the analysis area occurs mainly as patches within dry forest guild habitat. It is important to note that not all dry forest habitat includes potential sites for Spalding's silene. It is believed that potential habitat within the Missouri Heli Bug project area is very low. Based on ground reconnaissance of the proposed treatment areas it has been determined that there is no Spalding's catchfly habitat within or adjacent to the potential harvest units.

There are no Federally-listed endangered plants for the Idaho Panhandle National Forests.

Sensitive Plant Species and Forest Species of Concern

The subbasins of northern Idaho contain a wide array and diversity of habitats and plant communities, many of which contain plant species that are known or thought to be rare. Of the estimated 1,200 to 1,500 plant species known or thought to occur here, about 10% are considered rare or uncommon.

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 in habitat capability which would reduce the species' existing distribution. The Northern Regional Forester's sensitive species list for the IPNF contains 63 plant species. Twenty-nine species of sensitive plants are known or suspected to occur within the Coeur d'Alene subbasin.

Plant species identified as "Forest species of concern" are species which may not be at risk on a rangewide, regional or state scale, but may be imperiled within a planning area, such as a National Forest (USDA 1997). Forest species of concern are addressed in effects analysis to provide for maintenance of population viability as directed in NFMA.

Rare Plant Guilds

There is abundant habitat for moist and wet forest guild species in the analysis area, as reflected in Table III-17. Moist forest habitats and species have the greatest potential to be affected by proposed harvest activities, as these are the habitats most affected by the Douglas-fir beetles. Wet forest habitats occupy limited acreage within the analysis area, and would be buffered from any proposed treatment areas.

Table B-1. Extent of Suitable Sensitive Plant Habitat (Acres) in the Analysis Area.

Analysis Area	Alpine Guild	Dry Guild	Moist Guild	Wet Guild	Total Acres Suitable Habitat
Missouri & Scott Gulch	0	0	212	57	269

Wet and Moist Forest Guilds

Species of wet to moist forest habitats that are likely to occur in the project area include deerfern (*Blechnum spicant*), moonworts (*Botrychium lanceolatum, B. minganense, B. paradoxum, B. pinnatum, and B. simplex*), phantom orchid (*Eburophyton austiniae*), Henderson's sedge (*Carex hendersonii*) Constance's bittercress (*Cardamine constancei*), clustered lady's slipper (*Cypripedium fasciculatum*), and Idaho barren strawberry (*Waldsteinia idahoensis*). The sensitive species maidenhair spleenwort (*Asplenium trichomanes*), and chickweed monkey flower (*Mimulus alsinoides*) may also occur in rock seep microsites within moist/wet forests.

Several of the sensitive species are known only from wet habitats (*Botrychium ascendens, B. crenulatum, B. montanum, B. pedunculosum*), green bug-on-a-stick moss (*Buxbaumia viridis*), clear moss (*Hookeria lucens*), and Sierra woodfern (*Thelypteris nevadensis*). Wet forest habitat represents only about 6 percent of the total project area acreage.

There are two Forest species of concern found in moist to wet forest habitats that are either documented in the project area or have a high likelihood to occur there based on the proximity of known occurrences and the presence of suitable habitat. These include, round-leaved rein orchid (*Platanthera orbiculata*) and western starflower (*Trientalis latifolia*).

Dry Forest Guild

The Dry Forest Guild does not occur within the project area.

Changes in Sensitive Plant Habitat from Historic Conditions

The current condition of the vegetation in the project area has changed, in many respects, as compared to the historic condition. Some of the most significant changes to vegetation that have occurred are loss of riparian habitats, fragmentation of habitat by timber harvest , and introduction of numerous non-native pathogens and plant species. Many of the Coeur d'Alene sensitive plants occupy habitats consisting of late seral or old growth forest in wet-to-moist habitat type series. Currently about 40 percent of these habitats remain intact. Overall, this habitat is fragmented by past harvest and vegetation changes brought on by root rots and blister rust. This fragmentation has lead to decreasing recolonization opportunities for rare plants from existing populations. One of the more important implications of habitat loss and fragmentation is the reduced ability of sensitive plants to respond to random events or disturbances in the environment, whether these be natural or human-caused.

The database shows that in the project area, about 15 percent of National Forest System Lands have been regeneration harvested. Although there may be some double counting of acres, records also show that about 16 percent of the total National Forest System acres have had some other form of timber harvest (overstory removal, salvage, commercial thin, selection). While precise data is not available on the amount of sensitive plant habitat and populations that have been impacted or lost due to past disturbances, it can be surmised that changes have occurred.

B.4. Environmental Consequences

Direct, indirect and cumulative effects were addressed at the Project Area scale only. Protective measures designed to be implemented at that scale preclude any added or cumulative effects at a larger scale.

Alternative 1 (No Action)

Direct and Indirect Effects

The current Douglas-fir beetle infestation, and associated tree mortality encompasses approximately 200 acres in the project area based ground reconnaissance. Alternative 1 (the No-Action Alternative) reflects the extent of the bark beetle infestation in the project area. Under Alternative 1, effects would be variable across the landscape, depending on environmental factors and stand conditions. These effects would be highest in stands with a high proportion of large Douglas-fir (greater than 14 inches in diameter). More open stands, and stands having low proportions of large Douglas-fir trees would, in general, have less mortality. The effects of the bark beetle will be most pronounced in dry to moist habitats, which may be suitable for dry and moist guild sensitive plants species. The following table displays the distribution of infestation across the various habitats.

Table B-2. Alternative 1 (No Action).

Rare Plant Guild	Acres of Suitable Habitat Potentially Affected by Douglas-fir Beetles
Moist Guild	40
Dry Guild	0
Wet guild	0
Subalpine	0
Total Acres	**40**

Direct and indirect effects from the beetle infestation on sensitive plant populations are likely for species that may be present within affected stands. In stands where a high percentage of the canopy (greater than 50% loss of the basal area) will be lost due to mortality from the beetle infestation, certain sensitive plant species (such as Constance's bittercress) are likely to exhibit a beneficial response, due to factors like increased levels of light and available moisture. Other species, particularly clustered lady's slipper, are intolerant to factors like loss of shade and decrease in relative humidity, and may die or lose vitality.

Competitive weeds may increase in beetle-affected stands with greater than 50 % canopy loss. This competition may impact sensitive plants, and weed invasion into highly suitable habitat will generally have a negative effect on the native plants throughout the affected area.

There would be a increased risk of wildfire as dead woody fuels build up on beetle infested areas. Fire could result in the death of undetected sensitive plants occupying these sites, and habitat components may change enough as a result of fires to exclude certain plants on large areas. The effect of fire would depend on factors like the intensity of the fire, and the species ability to survive the event and compete in early successional habitat. The current level of knowledge of species ecology limits our ability to analyze these direct effects for many of the sensitive plant species.

Should a high-intensity, duff-replacing wildfire occur in moist forest habitat, populations of obligate mycorrhizal species such as the moonworts, phantom orchid, clustered lady's slipper, and round-leaved rein orchid could be destroyed. The prospect of recolonization of affected habitat by any of these species would depend on the extent and duration of habitat alteration and the availability of an adjacent seed source.

Populations of certain species occur in earlier seral habitats established by fire within the last 50 years, or in habitats that likely had frequent historical fires. It appears that these species are at least tolerant of more open forest conditions, and natural disturbance events such as fire. One such species is Constance's bittercress, a moist to wet forest guild plant. This species has been observed to survive and multiply, at least vegetatively, after wildfire on the St. Joe Ranger District (Mousseaux 1998). Indications are that survival of Constance's bittercress after fire may be dependent on the availability of moist microsites. Lichthardt (1998) noted from monitoring data, that this species had the highest stem densities in the earliest seral stages of forest communities

All the other moist forest and wet forest guild sensitive species have populations in mid- and later successional habitats, preferring more closed canopy conditions. Some of these species such as moonworts (*Botrychium* species), round-leaved rein orchid, phantom orchid, and clustered ladies' slipper, have factors like obligate soil mycorrhizae relationships that are likely to be affected by canopy reduction and moderate to intense (duff-replacing) fires. Stand-replacing fires were an important part of ecosystem processes in northern Idaho and the Coeur d'Alene Basin prior to the beginning of suppression efforts in the 1930s. While not much is known about the historic condition of rare plant communities, it is evident that with the decrease in the quality and amount of highly suitable habitats, and increase in fragmentation due to human activities, the ability of most rare plants to recolonize following disturbance has been reduced.

There would be no direct effects to Spalding's silene under Alternative 1.

Cumulative Effects

A list of reasonably foreseeable and ongoing projects in the Missouri, Scott Gulch drainages is provided in Chapter II. It is probable that even with the increase in fuel loads, as a result of beetle mortality, and added risks of wildfire, suppression activities will be partially successful at moderating the effects to areas containing sensitive plant habitat. It is probable that foreseeable noxious weed treatments will have some level of positive effect by curtailing rampant weed invasion of some habitats. Watershed restoration activities generally occur in riparian areas where a higher incidence of sensitive plant species occur. Surveys are conducted prior to implementation of these activities to minimize impacts to sensitive plant species. Activities such as fuelwood gathering, scattered in nature and staying out of riparian zones, could affect individual plants but would unlikely affect populations. Other timber sale projects on National Forest lands have been or would be surveyed prior to implementation. Timber sale projects on private ownership likely affect sensitive plants in those areas as generally there is no effort to identify and protect sensitive species of habitats in those areas. Grazing again could affect individuals but would unlikely affect populations. Grazing within the project area would most likely occur along edges of roadways.

Moist Forest Guild

Impacts to highly suitable moist forest habitat related to loss of canopy cover are predicted to be moderate where insects have affected stands to the point that promotes establishment of early seral understory vegetation. The likeliest impacts would be to those species with a broader habitat range (moonworts, round-leaved rein orchid, phantom orchid and clustered lady's slipper) which seem to require dense shade and/or soil mycorrhizae and which may not compete successfully with early seral forbs.

Cumulative impacts would result if the thinning of canopy in moist forest habitat is compounded by subsequent high-intensity, duff-replacing wildfires from predicted high fuel loading in untreated areas. Such a fire, if it were to occur, would be detrimental to the same obligate mycorrhizal species (moonworts, phantom orchid, clustered lady's slipper, and round-leaved rein orchid). Populations of these species could be destroyed if such a fire were intense enough to remove a significant amount of duff and organic material. The prospect of recolonization of affected habitat by any of these species would depend on the extent and duration of habitat

alteration and the availability of an adjacent seed source. Cumulative impacts to these species related to stand-replacing wildfire would be predicted to be low to moderate.

Long-term impacts to deerfern could occur in the event of a stand-replacing wildfire as a result of heavy fuel loads. Deerfern is apparently able to survive light surface fires, and may recolonize by sprouting from rhizomes or by spores from adjacent populations. Its response to severe wildfire is not known. Fire intervals in its cool, wet forest preferred habitat are estimated to be several hundred years, so that large-scale fires are usually catastrophic. Cumulative impacts on deerfern from a potential future wildfire would be difficult to predict.

Dry Forest Guild

No dry habitat guilds exist within the project area.

Effects Common To All Action Alternatives

No harvest or project-related activities are proposed within deciduous riparian, subalpine, peatland or aquatic habitats in the analysis areas. Therefore, there would be no direct or indirect impacts to any sensitive species occurring in these guilds (see Project Files – TES Plants). Timber harvest would take place in moist habitats, the effects would be confined to moist forest guild species. Since Riparian Habitat Conservation Area guidelines would be followed for all action alternatives, most wet forest habitat would be excluded from harvest activities, and burning would be controlled. The following table illustrates suitable sensitive plant habitat potentially affected by harvest treatment under each alternative.

Table B-3. Summary acres of suitable sensitive plant habitat potentially affected by harvest treatment, by alternative*.

Rare Plant Guild	Alt. 1	Alt. 2	Alt. 3
Moist Guild	0	15	10
Dry Guild	0	0	0
Wet Guild	0	0	0
Total Guild Acres	0	15	10

**Acreage figures were derived from Timber Stand Management Records System data.*

The actual effects of selective harvest would be similar to the effects of mortality on Douglas-fir caused by the beetle as in Alternative 1, No Action. The main difference would be that under the action alternatives, fuel loadings are reduced, whereas in untreated stands (Alternative 1) the fuel loads are untreated, resulting in an increased risk to sensitive plants from future stand-replacing wildfires. Small openings created by this harvest method could have incidental, microsite effects to some plants. If tree mortality in the selective harvest are is high, effects could be similar to a regeneration harvest. There would be some direct effects from selective harvest in suitable habitats for sensitive plants of the moist guilds, especially those that are intolerant of changes in the moisture and light regime (i.e. mycotrophic species, moonworts and orchids).

Regeneration harvest would directly affect Moist sensitive plant habitat. The limited data and observations available indicate that most species in these Guilds are intolerant of major canopy removal. The most detrimental sort of regeneration harvest treatment appears to be with ground based equipment, followed by a hot burn which consumes a lot of the organic matter on the site, or with mechanical fuels treatment. The least detrimental would be helicopter salvage logging, especially if it includes top attached yarding as the fuels treatment, though the potential for impacts due to alteration of the moisture regime would still be high. The action alternatives display various fuels treatment and harvest combinations. The changes in canopy cover would be similar under each however since most of the harvest is associated with the removal of dead trees. Ground disturbance would be minimal since the majority of the yarding method would be by helicopter.

Direct and Indirect Effects

Some damage to the live crowns of leave trees would be expected from harvest, but it would be minimal. Skyline would be intermediate in effect between helicopter and tractor yarding. Skyline would necessitate construction of corridors for yarding purposes in which long narrow canopy openings would be created. Some ground disturbance would result from the yarding process. Some damage to live crowns would occur with helicopter yarding but it would be more scattered in nature.

Threatened Species

There would be no effect to the listed Threatened species Ute ladies-tresses (*Spiranthes diluvialis*) or water howellia (*howellia aquatilis*) as a result of proposed activities, because there is a lack of suitable habitat in the project area. Refer to the Biological Assessment (Project Files) for additional information.

Spalding's silene (*Silene spaldingis*) has no documented occurrences in the analysis area nor is there any potential habitat in proposed activity areas under all action alternatives.

Sensitive Species

While informal observations have shown that many Botrychium species are dependent on some level of disturbance for reproduction, the nature of the disturbance is important. On the Mt. Hood National Forest in Oregon, natural disturbance areas favored by Botrychium species include floodplains in areas of intact, undisturbed vegetation, alluvial fans, trailsides and roadsides. On the IPNF plants are most often found on benches in the riparian zone of late-seral forests, though they are also known from moist subalpine habitats, glacial scours, young, regenerated stands, previously disturbed meadows next to game trails, or roadside ditches.

Though the amount of canopy cover is variable between different moonwort sites, the degree of moisture sites have in common suggests that it is an important requirement. Stream flow alteration due to changes in moisture regime may disturb plants and the fungal relationship necessary for reproduction. Zika (1992) noted that in Oregon, logging adjacent to existing moonwort sites has created problems with windthrow and microsite alteration. Moonworts are very sensitive to drought and may not appear in very dry, hot years (Lorain 1990). Striking changes in abundance and age structure in Botrychium populations have been observed from one year to the next (Zika 1992), and are probably related to moisture and the fungal relationship. Due to their small stature and tendency to occur singly or in small groups, and unpredictability of emergence, there is a possibility that moonwort plants could be missed even when field surveys are conducted.

The effects of harvesting and overstory removal on deerfern are not yet fully understood. Blake and Ebrahimi (1992) noted that deerfern populations in Washington state have withstood timber harvest and related treatment. Although populations studied in Idaho have been found to be genetically and phenologically similar to plants studied on the west coast (Cousens 1981), disjunct and peripheral populations may behave differently (Blake and Ebrahimi 1992). Stream rehabilitation and road reclamation work have the potential to impact deerfern habitat.

Constance's bittercress reacts favorably to openings in the forest canopy as long as the ground is not severely scarified by equipment (Crawford 1980). It does not tend to flower under shaded conditions, but may be able to maintain itself indefinitely by vegetative growth as long as competitive pressures are not too great (Lichthardt and Moseley 1994). Populations along the St. Joe and Selway rivers which were affected by crown fire have been observed to multiply vegetatively in response to increased sunlight, but successful flowering and seed set was low due to hot, dry conditions later in the summer. Indications are that survival of this species after canopy removal may be dependent on the availability of moist microsites.

Little is known of the biology of Henderson's sedge. However, observations of populations on the St. Joe Ranger District seem to indicate that this species may respond, at least vegetatively, to an increase in light due to partial canopy removal. While this species is often observed growing in highly shaded, mid to late seral forest habitats, on the Coeur d'Alene River Ranger District it has been observed growing along recreation and game trails, old roads, and in a recent clearcut that had been site prepped and burned. The plants observed in the clearcut appeared chlorotic, and unhealthy. It is not known what the reproductive capacity of plants is after regeneration harvest, or the long term potential for population survival.

In Oregon, Kagan (1990) found small populations of clustered lady's slipper tended to show no reproduction, possibly due to failure to establish the mycorrhizal relationship. Changes in climate or microsite moisture levels may be partly responsible for the limited germination or seedling survival. It is reported that clustered lady's slipper does not survive clearcutting; known populations in southwestern Oregon were extirpated due to clearcutting, yet individuals survived selective harvesting that did not significantly alter the moisture or shade regime (Kagan 1990). It is not known whether plants that survive selective logging can reproduce and therefore persist over time. Kagan reports that where individual plants survived selective logging they were often found within a short distance of large live trees or snags. The only documented population of clustered lady's slipper within the priority area occurs on private land near Coeur d'Alene Lake. This population, consisting of about 30 plants, has been observed to survive a decrease in canopy cover due to icestorm damage in 1996, and adjacent salvage logging. Long term effects of the loss of canopy are not known.

Information on the effects of wildfire on clustered lady's slipper are limited. In California, clustered lady's slipper appeared to have disappeared following hot fires. Most Montana and some Idaho occurrences are in Douglas-fir/ninebark and grand fir/ninebark habitats, which historically experienced frequent low to moderate intensity surface fires that occasionally killed overstory trees (Greenlee 1997). Studies have found that, historically, fire intervals in these habitats ranged from 5 to 50 years. It appears that fire, as a natural disturbance, has been important in maintaining habitats suitable to clustered lady's slipper. The effects of the application of fire, outside the time when natural fires occurred historically in north Idaho, are not known.

Western starflower is associated with seral forest communities and is known to tolerate soil disturbance and an increase in sunlight on otherwise moist sites. Populations occur along certain roads and trails, and the species tends not to flower under a dense canopy (Lichthardt and Moseley 1994). On the Coeur d'Alene, western starflower is growing in a riparian area subject to seasonal flooding, while populations in the vicinity of the St. Joe River are located on the edge of a road and on the cutslope. The species seems to have an affinity to light disturbance considering the sites that are currently known on the IPNF, however, its response to clearcutting is not known.

Idaho strawberry plants on the Coeur d'Alene have been known to survive, and do not seem to have been detrimentally affected by thinning of the canopy. Plants in the road right-of-way, which receive more sunlight, flower annually, seeming to have spread since the canopy reduction. This plant can increase vegetatively by means of underground stems (rhizomes), which likely gives it an advantage when there is a minor ground disturbance. Another occurrence of Idaho barren strawberry on the IPNF is in an ecotone between dry grand fir forest and a much drier and more open grand fir/Douglas-fir habitat. Plants in this location are not known to have been subjected to recent harvesting. However, their presence in such habitat indicates the species can tolerate drier, more open canopied forest conditions. Crawford (1980) reported that the abundance of Idaho barren strawberry increases after harvesting in clearcuts, seed-tree cuts, and shelterwood cuts on several different habitat types. Also, it was observed that broadcast burns in clearcuts did not appear to inhibit the growth of the species; however, prolonged heat generated from beneath deep slash piles would probably kill individuals of this plant, as it would any plant.

Cumulative Effects

Cumulative effects would not differ between the action alternatives. A list of reasonably foreseeable and

ongoing projects in the Beaver Creek drainage is provided in Chapter II. The effects of these project on sensitive plants has been described under alternative 1. Given the requirements for surveys and features for the protection of sensitive plant populations and habitat, additional impacts to sensitive species from proposed activities under the action alternatives would be low. A substantial reduction of fuel loads in treated areas would result in the reduction of some potential indirect effects, such as loss of habitats and populations during and after wildfire.

Alternatives 2 and 3

Direct, Indirect, and Cumulative Effects

Alternative 3 proposes 40 acres of harvest, with 10 acres occurring on suitable moist habitat type. Alternative 2 proposes harvesting on 55 acres with 15 occurring on suitable moist habitat. The effects to sensitive plant on 8 acres of salvage (units 1a-c) within this type would a minimal effect within the moist plant guild. Under Alternative 2, there would be 7 acres of underburning which would carry the risks to sensitive plants as described above for regeneration units. Under alternative 3 there would be 2 acres of underburning that would carry the risks to sensitive plants as described for regeneration units. Units 2 and 3 (alternative 3) and 23 (alternative 2), along with units 1a-c, should be surveyed for the presence of moist guild sensitive species prior to implementation of these alternatives. Cumulative effects have been discussed under Effects Common to All Action Alternatives.

Effects of Opportunities

Any watershed restoration work would need to be surveyed prior to implementation to assess potential impacts to sensitive plant species in the moist and wet guilds. Noxious weed treatments will have some level of positive effect by curtailing rampant weed invasion of some habitats.

Consistency With the Forest Plan and Other Applicable Regulatory Direction

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 IPNF" (Forest Plan, II-18). All of the proposed activities with the requirements for surveys and implementation of mitigation measures would meet the intent of the Forest Plan. The No-Action Alternative would also meet the intent of the Forest Plan.