United States
Department of Agriculture

Forest Service

April, 2008

Gold Crown
Fuels Reduction Project
Environmental Assessment

Sandpoint Ranger District
Idaho Panhandle National Forests
Bonner County, Idaho

View of Gold Hill from Lake Pend Oreille, looking southeast, near US 95 Long Bridge.
August 2007

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Gold Crown Fuels Reduction Project

Environmental Assessment

Idaho Panhandle National Forests
Sandpoint Ranger District
Bonner County, Idaho

April 2008

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Copies of this EA are available upon request in either printed format or on compact disc (CD) from the Sandpoint Ranger District. This document is also available on the Idaho Panhandle National Forests' website at www.fs.fed.us/ipnf/eco/manage/nepa/index.html.

Abstract: The Gold Crown Fuels Reduction Project is a fuel reduction and forest health restoration project in the area commonly known as Gold Hill, located between Bottle Bay and Sagle Slough, and approximately 2 miles southeast of the City of Sandpoint.

Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA), as well as other federal and state laws and regulations. This EA discloses the project's foreseeable environmental effects for consideration in determining whether or not to prepare an Environmental Impact Statement (see the associated Finding of No Significant Impact document.) The reports cited in this EA and additional project documentation can be obtained from the Idaho Panhandle National Forests website (http://www.fs.fed.us/ipnf/eco/manage/nepa) or from the project planning record, located at the Sandpoint Ranger District in Sandpoint, Idaho. The document is organized into four chapters.

- **Chapter I—Purpose and Need for Action.** This chapter briefly describes the proposed action, the need for that action, and other purposes to be achieved by the action.

- **Chapter II—Alternatives, including the Proposed Action.** This section details how the Forest Service collaborated with the public to develop the proposed action. This chapter also provides a detailed description of the agency's proposed action, as well as alternatives that were considered in response to public comments.

- **Chapter III—Affected Environment and Environmental Consequences.** This chapter describes the current condition of the project area related to the resources that could be potentially affected by the proposed action and describes the environmental impacts of the proposed action and alternatives.

- **List of Preparers**. This section provides a list of individuals and the interdisciplinary team of resource specialists involved with this project.

- **Agencies and Organizations Consulted**. This section lists the agencies or individuals who were consulted during the development of the environmental assessment, in addition to standard scoping and collaborative efforts.

- **Appendices**. The appendices provide more detailed information to support the analyses presented in the draft environmental impact statement.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Sandpoint Ranger District office.

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Chapter I—Purpose and Need for Action

Introduction

The USDA Forest Service, Idaho Panhandle National Forests, Sandpoint Ranger District has prepared this environmental assessment (EA) to disclose the potential effects of hazardous forest fuels reduction, forest health restoration activities, and road construction and maintenance activities in the Gold Hill area. This project, known as the Gold Crown Fuels Reduction Project, is located in Bonner County, Idaho, approximately 2.5 miles southeast of the City of Sandpoint (see Figure 1.) The project area is flanked on the east by Bottle Bay and on the west by Sagle Slough and a high-traffic railway. This area has been incurring high rates of new development and population increases during the last twenty years and is a popular recreation location for adjacent landowners and residents in the City of Sandpoint.

Analysis Documents Used for this Assessment

This EA is based upon analysis prepared in the following reports for the Gold Crown Fuels Reduction Project:

- Forest Vegetation Resource Report (Costich-Thompson 2008)
- Old Growth- Consistency Report (Costich-Thompson 2008)
- Fire, Fuels, and Air Quality Report (Koch 2008)
- Biological Evaluation for Wildlife and Wildlife Report (Madison 2008)
- Fisheries Biological Assessment/Biological Evaluation (Fairchild 2008)
- Addendum to Fisheries Biological Evaluation for No-Action Alternative (Fairchild 2008)
- Threatened, Endangered, and Sensitive Plants and Forest Species of Concern Report (Hammet 2008)
- Noxious Weeds Report (Hammet 2008)
- Soils' Specialist Report: Past Disturbance and Probable Impacts (Vander Meer and Burgoyne 2008)
- Hydrology Report (Maloney 2008)
- Visual Quality Report (Costich-Thompson 2008)
- Heritage Report (Sandberg 2008)

These reports are available from the project record or from the forest website at: http://www.fs.fed.us/ipnf/eco/manage/nepa.

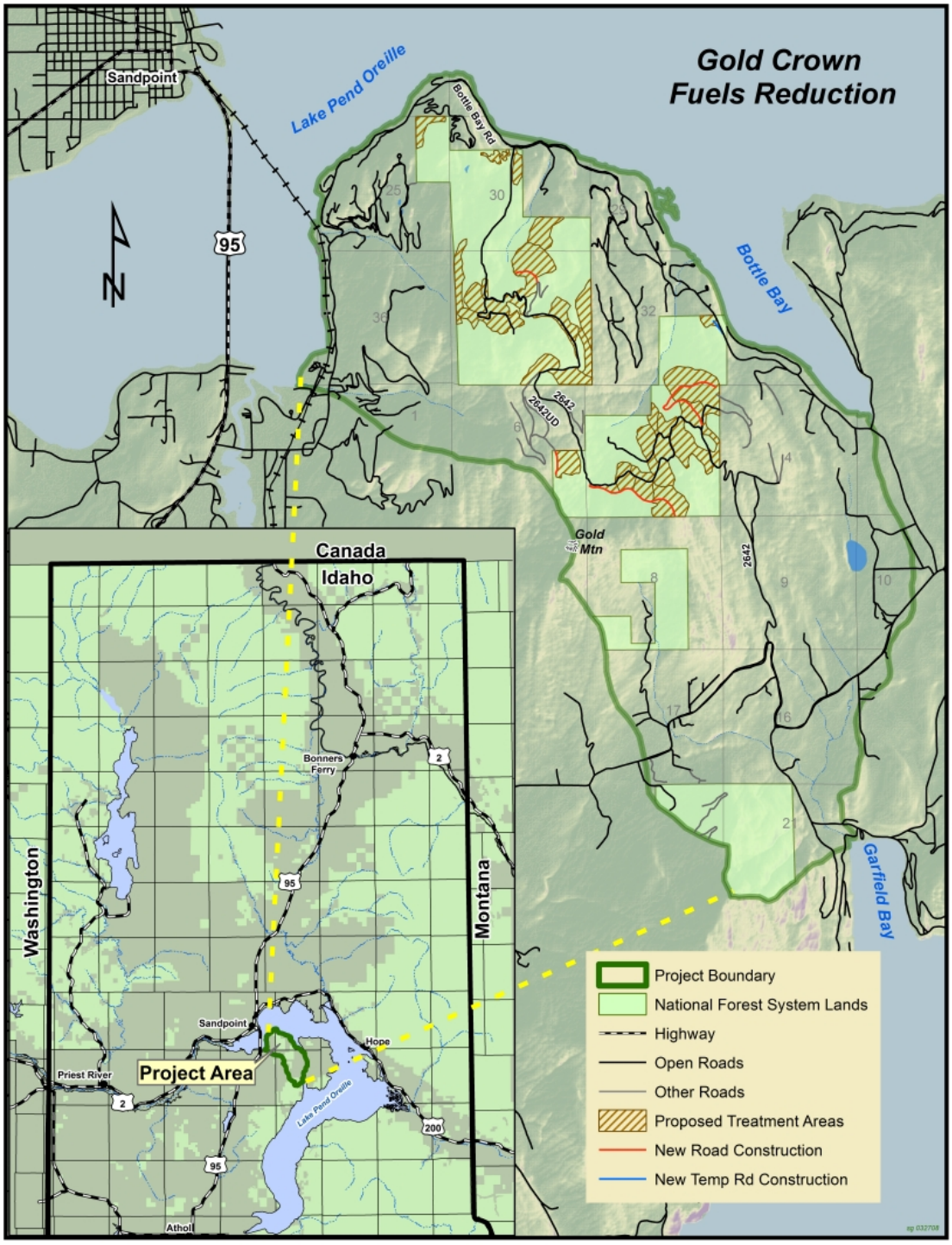

Figure 1. Vicinity Map of Gold Crown Fuels Reduction Project Area

Project Purpose and Need

National Direction

National Fire Plan (NFP)

During the last ten years, wildfires have increased in size and intensity within the United States. In 2000, in response to a request from President Clinton, the Secretaries of Agriculture and 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 (USDA and USDI 2008). This report, known as the National Fire Plan, outlined a strategy to reduce wildland fire threats and restore forest ecosystem health in the interior West. In 2001, Congress funded the National Fire Plan to reduce hazardous forest fuels and restore forests and rangelands. In response, the Secretaries of Agriculture and Interior, along with the Western Governors and other interested parties, developed a 10-year strategy and implementation plan for protecting communities and the environment (USDA and USDI 2001). This plan, coupled with the Federal Wildland Fire Management Policy (NIFC 2001), forms a framework of federal agencies, states, tribes, local governments, and communities to work together to reduce the threat of fire, improve the condition of the land, restore forest and rangeland health, and reduce wildland fire risk to communities.

Healthy Forest Initiative (HFI)

The Administration launched the Healthy Forest Initiative (HFI) in 2002 to reduce barriers to the timely removal of hazardous forest fuels. The HFI expedites administrative procedures for hazardous forest fuel reduction and ecosystem restoration projects on federal land.

Healthy Forests Restoration Act (HFRA)

Sixteen months after HFI was introduced, Congress passed the Healthy Forests Restoration Act of 2003 (HFRA) (P.L. 108-148) to reduce delays and remove statutory barriers for projects on federal land that reduce hazardous forest fuels and improve forest health and vigor. The act also helps rural communities, states, tribes, and landowners restore healthy forest and rangeland conditions on state, tribal, and private lands.

Criteria for projects to be authorized under this act include fuel condition class, adjacency to communities at risk (Federal Register, January 4, 2001, Vol. 66, No. 3, p. 751-777), and collaboration. The Gold Crown Fuels Reduction Project is authorized under HFRA to reduce hazardous forest fuels within the established wildland urban interface (WUI) designated by the Bonner County WUI Fire Mitigation Plan, completed in May 2004.

The Bonner County WUI Fire Mitigation Plan was developed as Bonner County's contribution to the Idaho Statewide Implementation Strategy for the National Fire Plan.

Each county was charged with bringing together all groups and agencies responsible for wildland fire suppression to develop a community-based wildland fire mitigation plan. This plan includes a number of possible fire mitigation activities that could be implemented by local agencies or homeowners. Within the plan, numerous areas within the county were also identified as priority areas for hazardous forest fuel reduction. The Gold Hill area was identified as such a priority.

HFRA requires that projects be developed in a collaborative manner. Collaboration has been ongoing throughout the planning process for the Gold Crown Fuels Reduction Project, involving local landowners, interested parties, adjoining land management agencies, the Bonner County Wildland Urban Interface Fire Mitigation Planning group, and those agencies with fire-fighting responsibilities in the project area (including both Idaho Department of Lands and Sagle Fire District.)

Local Conditions and Need for the Project

Historic Forest and Fuel Conditions

The historic forest conditions in the project area were more resistant to landscape-level wildfire damage than at present. Dry sites and rock outcrop areas sustained only open forest stands, consisting mainly of large ponderosa pine, western larch, and Douglas-fir. These dry sites were maintained by more frequent, low-intensity ground fires, which would consume ground fuels, kill patches of thick seedlings, and kill some individual trees. However, due to the open spacing of the overstory trees, fires seldom could be sustained as “crown fires”, which tend to be stand-replacing. Moister sites in the area historically supported mixed conifer and hardwood stands, many of which had a greater preponderance of western larch and western white pine than at present. These sites frequently were comprised of not only western larch and western white pine, but also western red cedar, Douglas-fir, grand fir, rocky mountain maple, red alder, and paper birch. Such sites incurred different frequencies and intensities of wild fire, often referred to as mixed-severity fire regime. In these areas, when fires occurred they would primarily act as ground fires, but due to the species composition and the closer spacing that moister conditions allowed, some patches and even entire forest stands would be killed as continuous fuel conditions became available. However, due to the patchy and heterogeneous nature of these types of stands, fires seldom became landscape-level, stand-replacing fire events.

Existing Forest and Fuel Conditions

Today, both dry and moist sites in the project area are crowded with denser forest stands, comprised mainly of shade-tolerant trees and dominated by smaller size classes. Several factors have influenced this unusual change in forest stand structures and species composition from historic conditions. After the large, catastrophic wildfires in 1910 (some of which burned very near to this project), the Forest Service began a policy of aggressive fire-fighting, putting out all wildfires possible. This resulted in many of the smaller, less-severe wildfires being put out immediately rather than being allowed to take on their historic role of thinning forest stands. Therefore, after the last, large recorded

stand-replacing fire event in the Gold Hill area (in 1922), dense natural regeneration of tree seedlings occurred. However, very few subsequent fires have aided in thinning those stands, which are now approximately 75-85 years old. These dense stands have lead to intense competition among trees for available water and sunlight and have resulted in substantial tree mortality. Following the last large fires, salvage harvesting by adjacent landowners (of either fire-killed snags or surviving relic trees) reduced available western larch, ponderosa pine, and western white pine as seed sources. Then, the accidental introduction of a non-native fungus, white pine blister rust, further decimated existing white pine stands.

Figure 2. Portion of stand 65402-001 illustrating tree encroachment on dry, rocky outcrops.

Today, dry sites and rock outcrops now have dense tree seedlings in the understory and closely-spaced Douglas-fir trees growing right up into the crowns of older, large relic ponderosa pine and Douglas-fir. These conditions have created continuous "ladder fuels", so that now if a fire were to occur, even the larger, more fire-resistant individuals would likely be killed. Moist sites now have very dense stand conditions, characterized by continuous fuels (both accumulated coarse woody debris on the ground, as well as dense seedlings and overstory trees.) Fuel hazards have been complicated in these areas because as shade-intolerant species like western larch, western white pine, and ponderosa pine have been crowded out, shade-tolerant species like Douglas-fir, grand fir, and cedar have taken their place. What used to be very heterogeneous, mixed conifer stands have become very homogenous stands. Now, root disease pathogens and insects that attack and often kill Douglas-fir and grand fir have proliferated, further amplifying the threat of severe wildfire. All of these conditions contribute to increased fuel loads, both on the ground as the result of

Figure 3. Portion of stand 65402-003 illustrating severe competition and substantial ground fuel accumulations.

dead trees and in the tree canopies as a result of dense stands of shade-tolerant species.

In addition to the increase in forest densities and hazardous forest fuels in the area, the human population in the area has also grown exponentially. The lowlands and privately-owned lakeshore properties around the National Forest System (NFS) lands in the Gold Hill area have incurred substantial development and increased population densities. Homes and other structures, as well as the public infrastructure that supports these properties need protection from wildfires. Therefore, the policy to aggressively suppress wildfires in this area undoubtedly needs to continue.

The concern is that with each passing year, and the additional accumulation of hazardous forest fuels in the area as more trees die, it becomes more difficult to successfully suppress wildfires. The existing conditions within the Gold Crown Fuels Reduction Project area present three primary concerns:

- Substantial forest fuel accumulations, caused by both coarse woody debris on the ground and dense, homogenous forest stands, have created a substantial risk of a landscape-level, stand-replacing fire event in the area between Bottle Bay and Sagle Slough, commonly referred to as Gold Hill.
- Dense forest stands, comprised of shade-tolerant species prone to insects and diseases present in the area, have created conditions where individual trees and entire forests will be susceptible to fires of any intensity.
- The forest conditions described above decrease the probability of successful, future wildfire suppression in the area. As a result, there is an ever-increasing risk of damage to or loss of homes, structures, and infrastructure, as well as an ever-increasing threat to people in the area.

Desired Future Conditions

The desired future condition would consist of forest stands with similar tree species composition, size classes, densities, and distribution to those patterns historically in the project area. Historically, these stands evolved under natural fire regimes. Fire frequency, the average time span between fires burning in the same place, historically occurred at least once every 35 years on dry sites and at least once every 35-100 years on moist sites. Achieving these desired conditions will take time. After all, 75-85 years' worth of forest ecological processes and disturbances (both natural and human-caused) have created the present stand conditions. Therefore, achieving the desired, future forest conditions will likely require more than this single project. The proposed project will begin the task of reducing wildland forest fuels and decreasing the risk of a landscape-level, stand-replacing fire event in the Gold Hill area, located between Bottle Bay and Sagle Slough. The desired vegetative structure would typically only support low fire intensity. After the proposed treatments, heavy concentrations of dead and down fuels would be removed through prescribed fire and piling. Modifying fuels would change potential fire behavior so effective, rapid, and safer fire suppression could occur, minimizing loss of key habitat and large trees. Direct fire suppression action could be used in treated areas, with the potential reduction in costs and the reduction of resource damage caused by a severe fire.

Following this project's implementation, a continued regimen of prescribed burning (where safe and feasible) combined with potentially another harvest project during the next 25-50 years, will substantially improve forest health conditions and reduce wildland forest fuels on NFS lands in the area.

Figure 4. Photo illustrating the result of thinning treatments, typifying more desired conditions.

Figure 5. Photo illustrating the result of irregular shelterwood, regeneration harvest, typifying more desired conditions.

Further, by reducing the wildland forest fuels and improving the health and resilience of residual forest stands in the area, we will enhance the future effectiveness of fire suppression tactics. Thereby, future threats to people, homes, and infrastructure would be reduced.

Project Objectives

This project's proposed action addresses the goals and objectives set forth in the Idaho Panhandle National Forests' (IPNF) Forest Plan (1987), National Fire Plan, Healthy Forests Initiative, the Healthy Forests Restoration Act (2003), and the Bonner County WUI Fire Mitigation Plan. The project also responds to ecological recommendations made in the Interior Columbia Basin Ecosystem Management Project. The Sandpoint Ranger District hopes to achieve three objectives with this project.

- To reduce wildland fuels on National Forest System (NFS) lands and lessen the risk of a landscape fire event in the area between Bottle Bay and Sagle Slough;
- To improve the health and resilience of the residual forest stands; and
- To enhance the effectiveness of future fire suppression tactics in the area.

The primary objective of this project is to reduce wildland fuels on NFS lands and lessen the risks associated with a landscape fire event in the area between Bottle Bay and Sagle Slough. This area has been identified as wildland-urban interface (WUI)—an area or zone where structures and other human development intermingle with wildland or vegetative fuels. The Bonner County WUI Fire Mitigation Plan collaboratively identified this area as a high priority for reducing the fire risk from wildland fuels and for mitigating fire risk by working with homeowners in the at-risk areas for structure protection and defensible space around their homes.

The secondary objective of this project is to improve the overall health and resilience of the residual forest stands. Reducing competition and enhancing diversity of species will increase the forest's ability to not only withstand catastrophic fire effects, but also enhance resistance to insect and disease outbreaks. Many of the forest stands are currently being stressed by a combination of factors, including drought, root disease, competition, and bark beetle attacks. The predominance of homogenous stands of Douglas-fir across the hillside exacerbates many of these problems, and could result in extensive mortality in the area if left untreated.

Additionally, fuel reduction efforts should enhance the effectiveness of fire suppression tactics, when fires do start in the future. We cannot significantly influence fire ignitions; we know fires will continue to occur. The factor we can influence is to what extent. The NFS land in this area is surrounded by private land, flanked on the western side by a high-traffic railway line, and is utilized heavily for recreational purposes. Humans are a primary cause of fires in this area, and lightning strikes have been and will continue to be additional sources of fire ignitions. Additionally, access in the area is somewhat limited. However, fuel reduction and silvicultural management techniques can help modify fire behavior, limiting areas that can potentially become or sustain a stand-replacing, crown fire event.

Regulatory Framework

Shown below is a partial list of federal laws and executive orders pertaining to project-specific planning and environmental analysis on federal lands. Disclosures and findings

required by these laws and orders are contained within the pertinent resources' Chapter III "Affected Environment and Environmental Consequences" discussion.

- Idaho and Washington Forest Practices Acts
- Multiple-Use Sustained Yield Act of 1960
- National Historic Preservation Act of 1966 (as amended)
- National Environmental Policy Act (NEPA) of 1969
- Clean Air Act of 1970 (as amended)
- Endangered Species Act (ESA) of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act of 1974
- National Forest Management Act (NFMA) of 1976 (as amended)
- Clean Water Act of 1977 (as amended)
- American Indian Religious Freedom Act of 1978
- Archeological Resource Protection Act of 1980
- Idaho Panhandle National Forests 1987 Forest Plan
- Healthy Forests Restoration Act (HFRA) of 2003
- Executive Order 11593 (cultural resources)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 13186 (Migratory Bird Treaty Act)

Healthy Forests Restoration Act (HFRA)

The following explains how this proposed project meets the intention and criteria of the Healthy Forests Restoration Act of 2003. The Act, in Section 102, defines the following criteria met by this proposal:

- The project area exists on **"Federal land in wildland-urban interface areas"** (HFRA 2003, sec. 102(a)(1).) The Bonner County WUI Fire Mitigation Plan (2004) identifies the project area as wildland urban interface, and further identifies the Gold Hill area as a high priority area for hazardous forest fuel reduction treatments.
- The project **"…focuses largely on small-diameter trees, thinning, strategic fuel breaks and prescribed burns to modify fire behavior, as measured by the projected reduction of uncharacteristically severe wildfire effects…"** (HFRA 2003, sec. 102(f)(1)(A).) This project's treatments focus on removal of smaller, weaker, and insect- or disease-infested trees (see Alternative B discussion within Forest Vegetation Resources section of this EA.) Approximately 95 acres of strategic fuel breaks on NFS land bordering private land are planned as part of this project. Although none of the areas identified as a priority for treatment within the project area could currently survive even a low-intensity prescribed,

broadcast fire, many of the planned treatments direct slash treatment and even maintenance to be accomplished via prescribed burning. The measures modeled to project reduction of potential wildfire effects include wildfire flame-length and rate of spread (see the Alternative A and B sections of the Fire, Fuels, and Air section of this EA.)

- The project **"…maximizes the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fire-resilient stands."** (HFRA 2003 sec. 102 (f)(1)(B).) Large, fire-resistant and site-appropriate trees such as ponderosa pine, western larch, and western white pine dominated the presettlement forest of this area. The project plans would retain those relics that survived the last, large fires in the area and promotes restoration of historic forest conditions by planting those same species in appropriate harvest units (see Proposed Action section within this EA.)

Idaho Panhandle National Forests' 1987 Forest Plan

The Idaho Panhandle National Forests' 1987 Forest Plan guides management activities, establishes management goals and objectives, and provides guidance for specific management areas (MAs) within the NFS lands in the area. Management areas are described in detail in the IPNF Forest Plan on pages III-1 through III-87. The Gold Crown Fuels Reduction Project (FRP) area is comprised of lands in MA1, MA4, MA9, and Riparian Habitat Conservation Areas (RHCAs), as summarized below.

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

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

Management Area 9: Consists of lands designated as non-forest lands, lands not capable of producing industrial products, lands physically unsuited for timber production, and lands capable of timber production but isolated by the above landtypes or nonpublic ownership. These areas are managed to maintain and protect existing improvements and resource productive potential with minimum investments.

Inland Native Fish Strategy (INFS) Riparian Habitat Conservation Areas (RHCAs): The standards and guidelines under INFS provide the management direction for RHCAs. This direction replaced previous forest plan direction for managing riparian areas using standards and guidelines described for Management Area 16 (Refer to Hydrology/Fisheries reports for further details).

Other forest plan goals and objectives most applicable to the purpose of this project include:

- Provide efficient fire protection and fire use to help accomplish land management objectives (IPNF 1987 Forest Plan, p. II-2).

- Efficient fire protection and use programs will be implemented based on management objectives, site specific conditions, and expected fire occurrence and behavior (IPNF 1987 Forest Plan, p. II-10).

- Protection of timber stands from insect and disease problems will center around the silvicultural treatments prescribed for timber management activities (IPNF 1987 Forest Plan, p. II-10, 11).

- Manage the forest resources to protect against insect and disease damage (IPNF 1987 Forest Plan, p. II-2).

- 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 (IPNF 1987 Forest Plan, p. II-8).

- 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 (IPNF 1987 Forest Plan II-8).

- To help provide for a diversity of plant and animal communities, habitats, and species, standards for old growth maintenance will be established. Approximately 10 percent of the Forest will be maintained in old growth as needed to provide for viable populations of old-growth dependent and management indicator species (IPNF 1987 Forest Plan, p. II-5).

Public Collaboration and Involvement

As a HFRA project, which emphasizes early public collaboration, two meetings were held with the Bonner County WUI Fire Mitigation Planning Group (referred to as BonFIRE), and one public meeting was held prior to development of the proposed action. These meetings helped develop and then refine the proposal. BonFIRE meetings were held on June 04, 2007 and November 05, 2007. Collaborative discussions with other adjacent land management agencies and the Sagle Fire Chief provided insight into future management potential and fire suppression issues. After identifying the general areas of highest fuel accumulation and risk, initial scoping efforts began in October, 2007 to help identify members of the public who were interested in collaborating on the project development. A formal public meeting was held on December 08, 2007. Collaborative efforts and efforts to seek public collaborative involvement included sending press releases to the local paper (The Bonner County Daily Bee), posting announcements at the Gold Hill trailhead, incorporating live interviews with local radio stations, and mailing informational letters and comment forms to landowners adjacent to the project area. A total of 114 letters were mailed. Of those, 49 responses were received and 11 interested

individuals attended the public meeting. Additionally, a member of a conservation group requested to meet with the project leader on December 10, 2007 to discuss the proposal and their group's potential concerns with the project. From the initial contacts and scoping efforts, an additional email list was also created to improve information access for those interested.

A proposed action and formal scoping notice was sent out to 114 individuals or organizations on December 19, 2007. Responses were reviewed and analyzed for content, and substantive comments were directed to those specialists whom were best able to respond, either in their documentation or project files. The project file contains the comments in their entirety. Substantive comments were summarized and grouped when appropriate.

Decision Framework

The responsible official for this project is the Forest Supervisor of the Idaho Panhandle National Forests, Ranotta McNair. This EA is ***not*** a decision document. The EA discloses the environmental consequences of choosing Alternative A (the no-action alternative) and Alternative B (the proposed action alternative.) This EA also aids the responsible official (or deciding officer) in determining whether the effects disclosed would have a significant effect on the environment. If the responsible official determines there would be no significant effects, she will select between the two alternatives, issue a "Finding of No Significant Impact and Decision Notice. The final decision will be based on the information in this document or the reports it tiers to, consideration of public comments, how well the alternative chosen meets the purpose and need for the project, and whether the chosen alternative complies with agency policy, applicable state and federal laws, and IPNF Forest Plan direction.

The responsible official will decide whether the Forest Service should manage vegetation on NFS land to protect adjacent communities, subdivisions, private property, and natural resources from the risks associated with wildland fire. If so, the following elements would also be decided:

- Where and to what extent should such activities occur in the project area?
- What is the long-term transportation system, and how will it be managed?
- What design features and mitigation measures should be used to meet laws and Forest Plan direction?
- How should such features be applied?
- What monitoring is needed to assure that desired results are achieved

Chapter II—Issues and Alternatives, Including the Proposed Action

Issues

An issue, as it relates to the NEPA process, is a point of disagreement, debate, or dispute with the proposed action based on some anticipated effect. The Forest Service separated issues into three groups: key issues, analysis issues, and non-substantive issues.

Key issues are defined as those directly or indirectly caused by implementing the proposed action and that result in an unresolved conflict. Key issues tend to lead to the development of alternatives to the proposed action. No key issues were identified from public scoping efforts; however, two additional alternatives were proposed (one by the Idaho Conservation League and another by a few, adjacent landowners.) Those alternatives are discussed below.

Alternative issues are concerns about the effects of proposed activities on the environment that are remedied by refining the design of a project or by applying mitigation measures. Analysis issues are not used to develop alternatives, but are carried forward in the analysis in order to provide a comparison of the alternatives and their effects. Each resource analysis in the Affected Environment and Environmental Consequences section provides details on the issues relevant to that resource, as well as how they are measured. Mitigation measures and project design features developed to minimize the effects of analysis issues are listed in Appendix A.

Non-substantive issues are identified as 1)outside the scope of the proposed action; 2)already decided by law, regulation, Forest Service direction, Forest Plan, or other higher level decision; 3)irrelevant to the decision to be made; or 4)conjectural and/or not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "… identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-substantive issues and reasons for their elimination from analysis is located in the project file.

Alternatives

This section is intended to present the alternatives in comparative form, sharply defining the issues, and providing a clear basis for choice among options for the responsible official. Detailed analysis of those alternatives not eliminated from consideration is located in the "Affected Environment" and "Environmental Consequences" of each resource section summary, as well as in the associated reports in the project file.

The interdisciplinary team used key issues from scoping to develop alternatives to the proposed action. Federal agencies are required by NEPA to rigorously explore and objectively evaluate a range of reasonable alternatives, as well as to briefly discuss the reasons for eliminating any alternatives that were not considered in detail (40 CFR 1502.14.)

The HFRA states that the Forest Service "shall study, develop, and describe—A) the proposed agency action; B) the alternative of no action; and C) an additional action alternative, if the additional alternative—i) is proposed during scoping or the collaborative process… and ii) meets the purpose and need of the project, in accordance with regulations promulgated by the Council on Environmental Quality" (HFRA section 104 c.)

The Forest Service considered four alternatives for the project area: no action, the refined proposed action, a no road construction alternative, and emergency egress expansion alternative. The no road construction and emergency egress expansion alternative were considered but were eliminated from detailed study, as described below.

Alternatives Considered, but Eliminated from Detailed Study

No Road Construction Alternative

The Idaho Conservation League proposed an alternative differing from the proposed action by suggesting that no new roads should be constructed. In lieu of road construction, they suggested that all treatments should be accomplished through use of either helicopter harvest/yarding or creation of "forwarder trails" equivalent to that necessary road length to access treatment areas.

Although helicopter harvest is undoubtedly less impactive to soils and hydrologic resources in the project than is road construction, there are several concerns with increasing the amount of required helicopter harvest/yarding with this project. First, helicopter harvest assumes that: 1) either no slash or fuels treatment is needed following harvest; 2) slash will be yarded to a landing as unmerchantable material (YUM) (which creates the need for very large helicopter landings); or 3) equipment and or people necessary to broadcast burn slash fuels can access the treatment areas through some other means than roads. Second, helicopter harvest is extremely expensive to perform, and a requirement for helicopter harvest frequently lowers the efficiency and economic viability of the timber sale contract (which is the tool for accomplishing fuels reductions projects). Economical feasibility of helicopter harvest is only achieved when yarding distances are less than one mile, when the silvicultural prescription recommended is a regeneration harvest, and when the average volume harvested is greater than 5,500 board feet per acre. For many different resource concerns (including hydrology, soils, visuals, and recreation) converting all treatment areas adjacent to new road construction to regeneration units is not feasible.

The other proposal offered by Idaho Conservation League was that if helicopter harvest was not feasible, then "forwarder trails" could be constructed to access treatment areas.

Again, many resource issues are at odds with this alternative. First of all, much of the ground would require excavation for even forwarder trails to reach treatment areas due to the steepness or topography complexities in the area. Secondly, as such, these forwarder trails would create a compacted or otherwise disturbed soil prism, similar to road construction with respect to hydrology and soils-related issues. Finally, many of the treatment areas requiring access have been planned as skyline (cable) yarded units. As such, a skyline yarder would have difficulty utilizing a non-constructed, non-excavated trail to access yarding corridors.

During initial project planning and development, additional road construction was considered and some even carefully described by road engineers. However, the IDT decided that some portions of the planned road should be dropped from the project to eliminate resource concerns related to steep hillslopes or hydrologic features. In dropping some of the initially considered roads, potential treatment areas were also dropped from consideration. In essence, the IDT, during the transportation analysis or Roads Analysis Process (RAP), determined the need for both existing roads on the landscape and future potential needs for new roads (related to this proposed action and other management activities.) The road construction currently scheduled as part of the proposed action is a balance between what areas would be feasible, efficient, and economically-sound for road construction investments and those areas which (for resource or economic reasons) should be considered only for helicopter harvest.

Furthermore, by eliminating road construction from this project, future fire suppression access will not be improved and future access needs for silvicultural treatments will not be possible.

For these reasons, this alternative was eliminated from further consideration.

Emergency Egress Expansion Alternative

During the public meeting, held on December 08, 2007, and during formal scoping, completed January 22, 2007, two members of the public voiced a concern over their lack of available emergency egress routes in the area. Their proposal was for the Forest Service to add an approximately 0.4 miles of new, permanent road construction to the existing 2642 C Road, which could tie into roads on private land in section 32, Township 57 North, Range 1 West of the Boise Meridian.

Although the landowners concerns regarding emergency egress in the event of a landscape-level fire event are valid, many factors are involved. First of all, the interdisciplinary team (IDT) felt it difficult to justify road construction for emergency egress as part of the purpose and need. Second, the road grade required to tie the existing 2642 C Road into existing private roads in the area would be 8-15% downhill, as you move from Forest Service to private land. So, citizens trying to use the road would have to be traveling a steep, uphill road to escape. Furthermore, because of this same grade issue, it is highly unlikely that fire suppression agencies (like Idaho Department of Lands or Sagle Fire District) would utilize the proposed road to come downhill towards a fire (which would likely be topographically driven uphill towards them.) In addition,

extension of the 2642 C Road would require at least one perennial crossing and two ephemeral crossings of Gold Gulch tributaries. Other resources, including heritage sites, could also be placed at-risk by such construction.

After follow-up discussions with the Sagle Fire District Fire Chief (the primary agency responsible for fire protection of these landowners) (Goodyear, 2008), the IDT determined that additional egress may be desirable but probably is not necessary. If landowners simply improve the current access road, ingress for emergency vehicles and fire suppression equipment, as well as safe egress for landowners could be attained.

Therefore, this alternative was eliminated from further consideration as part of this project.

Alternatives Considered in Detail

Alternative A—No Action Alternative

Under Alternative A, the No-Action Alternative, current management plans would continue to guide management of the project area. However, no thinning, no thinning with group selection harvests, no regeneration harvests and subsequent replanting, no overstory removal with associated precommercial thinning of understory, no hand thinning, and no special treatments for hazardous fuel reduction on rock outcrops would be performed to accomplish project objectives. Additionally, no new roads would be constructed or reconditioned. Existing, scheduled road maintenance activities and weed treatment activities would continue, as would emergency fire suppression and recreational activities.

Alternative B—The Proposed Action

The proposed action was designed to accomplish to project's purpose and need. As such, the silvicultural and fuel reduction treatments, harvesting methods, and road construction would reduce wildland fuels on NFS lands and lessen the risk of a landscape fire event in the area commonly referred to as Gold Hill, located between Bottle Bay and Sagle Slough. Further, the project would improve the health and resilience of the residual forest stands and enhance the effectiveness of future fire suppression tactics in the area.

The following narrative describes both silvicultural and slash/fuel treatments, as well as the proposed road construction and maintenance activities in detail.

Silvicultural and Slash/Fuel Treatments

To attain the project's three, stated objectives, the Sandpoint Ranger District identified and prioritized stands needing treatment. (See Treatment Map Figure 6.)

In order to evaluate the actual fire risk related to wildland fuels in this area, the Forest Service began forest stand evaluations late in 2006. While performing walk-through examinations of forest stands, foresters and fuel specialists identified and prioritized areas in need of fuel reduction treatment by considering existing stand conditions and expected

stand development; fuel type and hazard; insect and disease mortality within the stand; adjacency to private land, public infrastructure or roads; past and current fire history; as well as spatial arrangement on the landscape.

Once a stand was identified as a priority for treatment, several other factors were considered to determine the type and feasibility of necessary treatment. Such factors include extent of tree mortality; severity of insect infestation or disease infection; density of stand (number of trees per acre); species composition; accessibility; slope/terrain; as well as the quantity and size of the existing fuel components.

The process described above resulted in the proposal of a combination of silvicultural and slash/fuel treatments, as outlined below. See Table 1 for a summary of treatments proposed, and silvicultural treatments are described below.

Table 1. Summary of treatments for the Gold Crown Fuels Reduction Project

Silvicultural Treatment	Acres	Slash/ Fuels Treatment	Acres
Thinning	128	Grapple Pile & Burn	86
		No slash treatment necessary	7
		Corridor Piles & Burn	35
Thinning with Group Selections	214	Grapple Pile & Burn	99
		Prescribed Broadcast Burn	110
		Yard Unmerchantable Material; Landing Pile & Burn	5
Regeneration Harvest	208	Prescribed Broadcast Burn	148
		Yard Unmerchantable Material; Landing Pile & Burn	39
		No slash treatment necessary	15
		Grapple Pile & Burn	6
Overstory Removal; Precommercially Thin saplings	6	Hand Pile & Burn (adjacent to road)	1
		No slash treatment necessary	5
Special- Hazardous Fuels Harvest on Rock Outcrops	11	Prescribed Broadcast Burn	11
Hand Thin	6	Hand Pile & Burn	6
Total Acres	**573**		**573**

Table 2. Logging methods under the proposed action.

Harvest/Logging Method	Acres
Combination- Tractor/Line Pull	50
Hand Work	6
Helicopter	65 (88*)
Mechanical (Tractor or Cut-To-Length Equipment)	203 (180*)
Skyline	238
Tractor swing to skyline	11
Total	**573**

Treatment Type 1– Thinning

Approximately 128 acres of forest stands would be treated using a commercial thinning harvest. Areas where this treatment would be used are generally dense forest stands where removal of some merchantable trees is necessary to attain fuel reduction and silvicultural objectives. These stands tend to be dense with overlapping tree canopies and contain substantial amounts of “ladder” or ground fuels. Thinning reduces competition within forest stands, increase residual tree growth and vigor, and trends stands towards species compositions and structures that are more ecologically resilient to potential disturbances.

These stands would be thinned by harvesting approximately one-half of the trees. The larger, healthier trees would be favored for retention. Thinning would create spaces between tree crowns, decreasing the probability that fire could travel from one crown to another. In addition, some of the smaller, “understory” trees would be removed from these areas to reduce the “ladder” fuel component and decrease the chance that a ground fire could travel from the forest floor up into the tree crowns.

The resulting slash from the thinning, as well as some fuels on the forest floor, would then be disposed of in the following manner. Approximately 86 acres would be mechanically-piled by an excavator type machine, with a “grapple” thumb (known as “grapple-piling”). Piles would be burned after allowing them to dry out. Approximately 35 acres would be harvested using a skyline system, and the subsequent slash would be treated by grapple-piling the skyline corridors and burning the piles after they dry out. The remaining approximately 7 acres within this treatment type would not require slash treatment.

Treatment Type 2– Thinning with Group Selection Openings for Reforestation

Approximately 214 acres of forest stands would be treated using a thinning with group selection method. Stands designated for this treatment generally require some spacing between tree crowns to reduce fuels; however, within these stands there are also some small (2-7 acre) pockets of severe root disease-infected trees. Therefore, the severely infected trees and susceptible species in these pockets would be harvested entirely, resulting in openings large enough to plant preferred species, such as western larch, western white pine, or ponderosa pine (depending on the site.) Such openings would account for less than about 10% of these treatment areas.

Fuels and slash would then be treated through the following methods. Approximately 99 acres would be grapple-piled, and piles would be burned after allowing them to dry out. Approximately 24 acres would have skyline corridors piled and burned. Approximately 110 acres within this treatment type would be suitable for prescribed, broadcast burning following harvest. (Only certain species and larger size classes of residual trees can tolerate a broadcast underburn.) The remaining approximately 5 acres within this treatment type would have slash treatment through yarding of unmerchantable material (YUM) to landing, where it would be piled and burned.

Treatment Type 3 – Regeneration Harvest and Reforestation

Approximately 208 acres of forest stands would be treated using an irregular shelterwood method of stand regeneration. Regeneration harvests primarily need to occur where the stand density, homogeneity within the stand, or the degree of insect or disease infestations do not allow for a thinning prescription. Areas where this treatment would be used are generally very dense forest stands, which could not withstand a thinning treatment. In many cases, the stand is either suffering from severe mortality (due to competition, insect attacks, or disease infection) or the majority of trees are so dense that they grew tall and "spindly" and would not be wind-firm following a thinning treatment.

The resulting treatment areas would look "clumpy" in nature, because groups of trees rather than solitary trees would be left scattered throughout treatment areas. Trees favored for retention in these treatment areas would include larger, healthy trees (which provide diversity and visual quality), as well as the early seral species, such as white pine, larch, and ponderosa pine.

Following, or in conjunction with, a regenerative harvest the areas would also be slashed to remove small undesirable and cull trees, the primary ladder fuel component. Then to reduce fuels and prepare the sites for planting, approximately 148 of those acres would be broadcast burn. Approximately 39 acres of this treatment type cannot successfully be broadcast burned, so slash and non-merchantable material in these areas would be "yarded" to a landing, piled, and burned. Approximately 6 acres within this treatment type would have slash "grapple-piled" and burned, and the remaining approximately 15 acres would not require slash treatment.

After the regenerative harvest and slash/fuel treatments are completed, the sites will be planted with site-appropriate, preferred tree seedlings. Fire, disease, and insect-resistant species suited to the site (such as larch, ponderosa pine, and/or white pine) will be favored for planting, to help increase diversity and the long-term resilience of the resulting new forest stand.

Treatment Type 4 – Special Hazardous Fuels Harvest on Rock Outcrops

Approximately 16 acres of forest stands will be treated using this method. These are dry, rocky outcrops described earlier in the "Background Information" section. Some of these outcrops are located in areas that we can effectively treat and reinstitute a fire regime more similar to historic fire intervals. Large, relic trees will be left, but younger, encroaching trees will be harvested. Then these areas will be burned, rejuvenating grasses, forbs, and shrubs. The resulting openings, which will have a very natural appearance that blends into the landscape character, would be maintained in the future by prescribed broadcast burning every 10-30 years.

Treatment Type 5– Hand Thinning & Piling
Approximately 6 acres will be treated using this method, primarily adjacent to the northernmost portion of the Gold Hill Trail (trail no. 3). This treatment will focus on disposal of both ladder and ground fuel accumulations immediately adjacent to the trail, which represents a significant fire risk. In this area, the ground fuel accumulations are so heavy that should a fire start, it would almost certainly move up into the crowns of the overstory, becoming a more significant, stand-replacing fire. Hand treatment will consist of slashing ladder fuels, cutting up larger down fuels on the ground, piling the fuels and burning piles to reduce the hazard.

Treatment Type 6 – Overstory Removal/Precommercial Thinning
Approximately 6 acres will be treated using this approach. The area slated for this treatment is a stand that was regenerated about 13 years ago, using a shelterwood method. The overstory trees are scattered Douglas-fir, western hemlock, grand fir, and cedar which were left to "shelter" the larch and white pine seedlings planted in the understory. Now that the larch and white pine plantings are older (6-15 feet tall), they are beginning to compete with the overstory trees for sunlight. Therefore, the overstory needs removed to allow the planted seedlings/saplings room to grow and thrive. If left untreated, the shade from the overstory would actually inhibit growth in the new stand, potentially resulting in death of those preferred species.

In this treatment type, there are so few overstory trees that will be removed, that slash treatment will be minimal. Harvest-related fuels will be handpiled adjacent to the 2642 road, to be burned during the appropriate season.

In addition, following the overstory removal, because other shade-tolerant seedlings (such as grand fir and hemlock) have also started to establish within the stand, both planted and natural regeneration will be precommercially thinned. An early thinning such as this improves the growth and vigor of the stand, reduces competition, decreases certain fungal diseases, and helps maintain both diversity and a component of the preferred disease and insect-resistant species.

Proposed Road Work

In order to determine the road-related activities necessary for this project and future management on NFS lands within the project area, a Roads Analysis Process (RAP) was completed, with input from foresters, silviculturist, road engineers, geotechnical specialists, soils scientists, hydrologists, and fisheries biologists, under the direction of a line officer. Road needs, for this project and future management, were determined, potential road locations were identified, such locations were analyzed, and feedback from specialists was incorporated into the road plan. Some initially considered road locations were dropped from the proposal due to resource concerns; other road segments were identified as potential opportunities for road maintenance improvements. None of the existing roads on NFS lands within the project area were determined to be unnecessary; therefore, no roads are proposed for decommissioning (other than the one temporary road proposed.)

FS Road 2642, also known as Sky Meadow Lane, currently provides the primary access into the proposed treatment areas, as well as crossing and accessing numerous private

residences the first 2.0 miles. The road extends north, then northwest, off of the Sagle Road. In order to efficiently and successfully access many of the proposed treatment areas, some road construction and maintenance activities on NFS lands also need to be accomplished. Approximately 2.2 miles of proposed, new system road construction would be placed into "storage" following completion of project activities. "Storage" conditions would, in essence, close the new roads to motorized use, reduce maintenance needs, minimize potential hydrologic impacts, and maintain wildlife security in the area. About 0.3 miles of existing system road would need to be reconditioned in order to implement project activities. This road is currently closed with an earthen barrier, which would be re-established following project implementation. Approximately 0.13 miles of new, temporary road would need to be constructed to access unit 34. Following project implementation, the new, temporary road would be completely obliterated, recontouring the road prism back to the pre-construction slope conditions. Additionally, routine road maintenance would occur on about 8.5 miles of existing roads in the project area. Table 2 below, summarizes the proposed road-related activities.

Table 2. Gold Crown Hazardous Fuels Reduction Proposed Road Treatments.

Proposed Road Work	Miles
New Permanent System Road Construction- be gated and put in storage following project activities	2.2 miles
Maintenance of Existing Road Access (FS Road 2642/ Sky Meadow Road)- requires maintenance, to include brushing, blading, drainage repairs, etc.	8.5 miles
Reconditioning of Existing Road – reconditioning of existing, system road which is currently barriered	0.30 mile
New Temporary Access- temporary road prism construction necessary to access unit 34 (adjacent to Bottle Bay Road). Following project implementation, road will be obliterated.	0.13 mile

Timing of Proposed Activities

The proposed action would be accomplished using a timber sale contract. As with all timber sale projects, associated activities occur in a certain order, and accomplishment of such a timber sale may require 5-7 years from the time a contract is awarded. So that harvest and fuel reduction treatments could be performed, the first items to be accomplished with this project would include all required road maintenance, road construction, and road reconditioning activities. When road work is completed, harvesting can begin. Harvesting schedules for different units may depend on contractor needs or design features developed as part of the project. However as harvest is completed within each unit, slash clean-up and fuels reduction work will occur based upon the specific prescription developed for each unit.

One note of mention is that some helicopter harvest is planned for the project, including units 15, 25, 26, 27, and 28. Currently, sawlog timber markets are such that helicopter harvest is more difficult economically. As a result, the District is seeking other opportunities to make these units more feasible. In addition, another option may be to create two sales out of this project, trying to sell the helicopter sales when markets make

it more economical. Therefore, the helicopter harvesting could potentially occur at a later date.

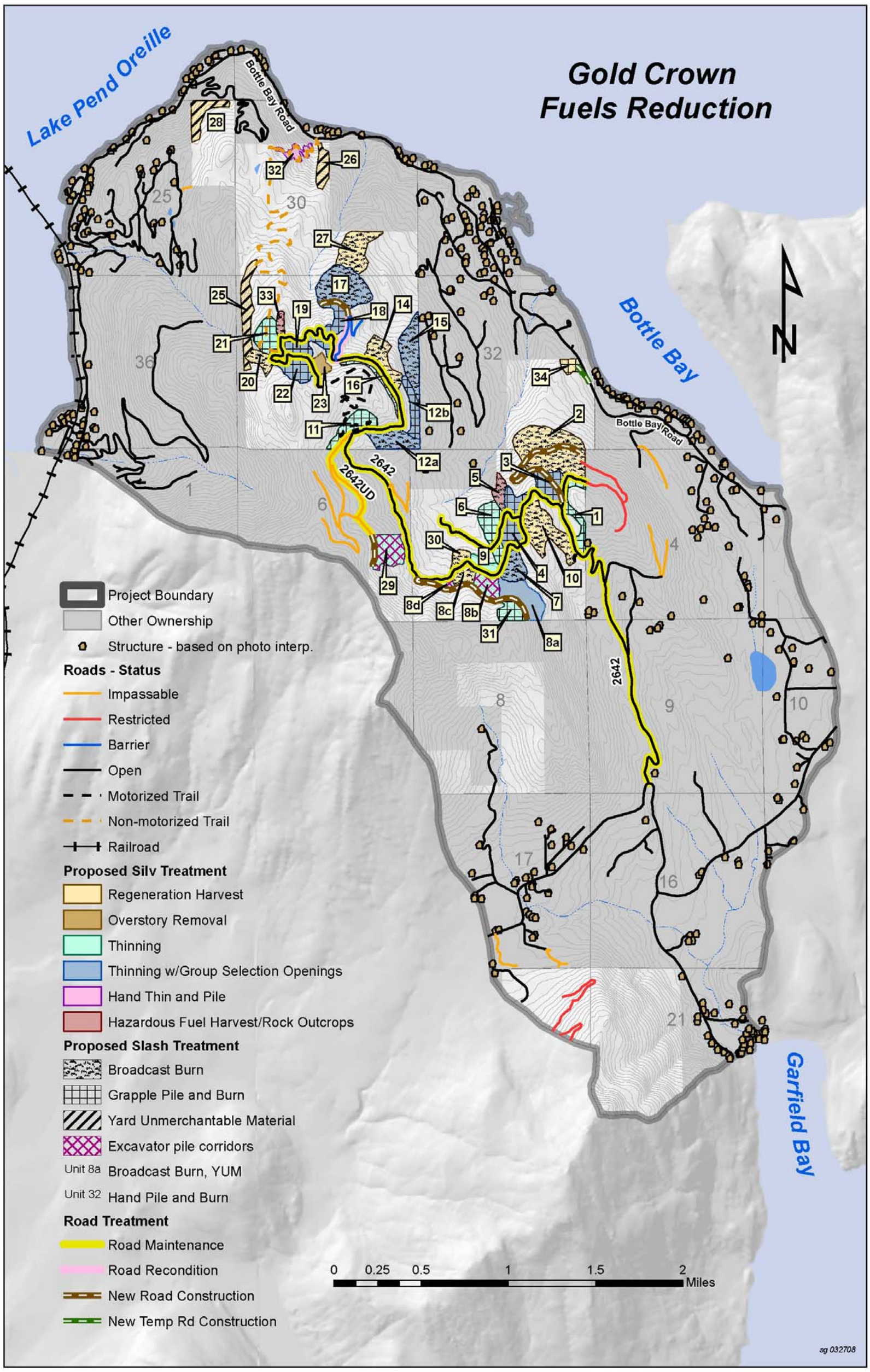

Figure 6. Map of Proposed Action and Project Area- Gold Crown Fuels Reduction Project

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Chapter III—Affected Environment and Environmental Consequences of the Proposed Action

This section provides a summary of the affected environment and environmental consequences analysis of both Alternative A—No Action Alternative and Alternative B—The Proposed Action Alternative, as it pertains to each potentially-affected resource. As such, it provides the necessary information to determine whether or not to prepare an Environmental Impact Statement. The associated "Finding of No Significant Impact" discusses whether this project has significant effects. Further analysis and conclusions about the potential effects are available in resource specialist reports and other supporting documentation cited below. As noted in the introduction, these reports can be viewed on-line at http://www.fs.fed.us/ipnf/eco/manage/nepa or can be found in the project file.

Forest Vegetation Resources

Existing Condition

Table III-1 displays the existing forest cover type and stand structure classes in the Gold Crown FRP area. The existing condition information represents the cumulative effects of past disturbances and activities including past harvest, fire suppression, disease and insect attack, and vegetation growth to the present.

Most of the current vegetation in the Gold Crown FRP project area established following large fires in 1910, 1922, or other large unrecorded fire(s) that occurred between 1926 and 1931. Some forest stands (like a few within the northwestern aspect in the Hays Gulch drainage) escaped these last large fires in the project area. However, many stands were completely consumed and began the process of regeneration. Prior to 1910, fire had a major influence on forest vegetation in the project area [Interior Columbia Basin Ecosystem Management Project (ICBEMP) Scientific Assessment (Quigley and Arbelbide 1997), the Northern Region Overview (USDA Forest Service 1998) and data from the Pend Oreille Geographic Assessment (USDA Forest Service, unpublished report).] On drier sites, short-interval, low-intensity, underburning fires maintained stand structures such as large, open-grown ponderosa pine, western larch, and Douglas-fir. On moister sites, mixed-severity fires favored tree species like western larch, which are adapted to survive fire, and western white pine, which are adapted to reproduce and compete following fire.

Historic logging, including small sales that occurred between 1924 and 1940 likely removed both sound snags and fire-surviving trees that had high economic value. This logging removed trees that likely could have contributed both structural and species diversity to the stands that exist today.

The more recent timber sales in the project area, including the Grouse Mountain Sagle timber sale (1987), the Gold Hill timber Sale (1995), and the Big Grouse timber sale

(1996) timber sale have influenced the existing condition of the forest vegetation in the Gold Crown FRP project area (see vegetation cumulative effects section). These timber sales resulted in some positive effects to both species composition and forest structure in the project area. Abundant overstory structure, generally of preferred species, was retained in treated areas. These trees are likely to continue contributing to both the structure and species diversity of the treated areas. Additionally, areas treated with regeneration harvesting were planted with western white pine, ponderosa pine, and larch. These planted trees are now sapling size and will provide resilient, sustainable forest cover as they grow.

Figure III-1. Portion of Stand 65402-001 on dry, rocky outcrop.

On dry sites within the project area, lack of recent fire has allowed thick stands of trees to develop and encroach upon what once were natural openings (Figure III-1). As a result, natural openings that were historically kept open by fire have become smaller or absent. Most dry sites are now homogenous, over-stocked, closed-canopy stands dominated by Douglas-fir (Table 1).

Without the influence of fire to naturally thin stands, and with the added shade created by dense overstory components, Douglas-fir seedlings have a competitive advantage over ponderosa pine seedlings for germination and establishment in these stands. Increased stand densities are crowding the once open-grown ponderosa pine overstory trees that survived the last large fires in the area (in 1910, 1922, and/or 1926-31.) Competition for limited resources exacerbates drought stress and is predisposing even the relic trees to insect attack, including western pine beetles and Douglas-fir bark beetles. Moreover, intense competition in these dense stands for limited resources is causing competition-based mortality in numerous size classes. This process within forest stands is often referred to as self-thinning. However, as trees die and fall over, the accumulation of coarse, woody debris on the ground contributes significantly to increased fire hazard. Because Douglas-fir and

Figure III-2. Portion of Stand 65401-016 illustrating competition stress, as well as insect and disease activity.

grand fir are highly susceptible to endemic root diseases in this area, the preponderance of these species facilitates the extensive spread of root disease-caused mortality. Furthermore, during the last few years an increase in Douglas-fir bark beetle (DFBB) activity in the area has also been observed. DFBB signs are common on recent wind-thrown trees, as well as many live trees (especially those already stressed by root disease or drought stress.) All of these factors contribute to increased fuel loading and a decreased likelihood that a fire could be quickly, easily, or even successfully suppressed.

Figure III-3. Portion of stand 65402-003 illustrating intense competition and substantial ground fuel accumulations. Note the fire snag in the background- the result of fires in the 1920's.

On moister sites, lack of disturbance (primarily mixed-severity fire) coupled with the unintentional introduction of white pine blister rust and subsequent widespread white pine mortality, has resulted in homogenous, over-stocked stands dominated by Douglas-fir, grand fir, and western redcedar, with lesser amounts of healthy western larch and negligible amounts of white pine (Figure III-3).

As on dry sites, root diseases and bark beetles are causing extensive mortality of Douglas-fir and grand fir throughout the project area. Western larch are generally "whippy or spindly" with poor height-to-diameter ratios and small crowns due to intense competition from crowded, overstocked stands, and many larch are infested with parasitic dwarf mistletoe.

There is an increased proportion of western redcedar and grand fir on moderately-moist, mid- and upper slope sites relative to their historic landscape distribution. The presence of these shade-tolerant species on these sites increases crown densities, creates fuel ladders (or fuel continuity from the ground level up into the uppermost canopy of the forest stand), increases the risk of crown fire, and reduces the chance of successful fire suppression. Widespread mortality and fuel ladders would result in fire behavior best described by a fuel model 10 (Anderson 1982; also see Fire and Fuels Report). The distribution of these conditions across the project area has set the stage for higher risk of an intense, stand-replacing fire event if left untreated.

Desired Condition

Forests are not static things, given that trees, which comprise a forest, are living things. All living things have an expected lifespan, which is influenced by environment, disturbance, and stress. To maintain healthy, sustainable forest ecosystems in the long-term, species composition and forest structures must be adapted to disturbances such as insects, diseases, fire, and climatic variability. In an adaptable ecosystem, species

diversity would be such that even as individuals, groups of species, or even entire forest stands succumb to certain stressors, the remainder of the forest can still thrive, adapt, or regenerate successfully. In other words, resiliency and diversity are very important to overall, long-term forest and ecosystem health.

To achieve these conditions, seral species such as western larch, western white pine, and ponderosa pine should be well represented across the project area. Long-lived, early seral species such as these are adapted to the disturbances common to the Gold Crown FRP area. These particular species are resistant to the root disease endemic to the area, regenerate quickly following large-scale disturbances such as fire, and both larch and ponderosa pine have especially thick bark which enables them to survive most low- or mixed-severity fires. Increases in the current composition of these early seral species, combined with a decrease in the current composition of Douglas-fir, grand fir, and western redcedar would better represent the historic species mix in this area and be better suited to adapting to changes and disturbance in the future. Furthermore, because these species are less likely to die prematurely due to insects, disease, and fire disturbances, they have a far greater potential for reaching large diameter size classes and older age classes than many of the shade-tolerant species currently proliferating in the area.

Ideally, both immediately and far into the future, forest structures would have only scattered, discontinuous ladder fuels and lighter fuel loading than at present. Future conditions should also have large diameter, and older age class trees represented at higher percentages than at present. These conditions would minimize fire damage and risk to people, private property, and natural resources values. The risk to people and property is especially important, as continued development and population within this area of wildland-urban interface is expected to increase.

Relative to existing forest conditions, desired stands on moist sites would contain more western white pine, western larch and ponderosa pine and less Douglas-fir and grand fir. These vegetation conditions would be similar to those that occurred prior to European settlement and the unintentional introduction of white pine blister rust. White pine-dominated cover types once occupied 24.3% of forestland in the Pend Oreille sub-basin of north Idaho (USDA Forest Service, unpublished report). Two percent of the Pend Oreille basin and 1.8 percent of the Gold Crown Fuels Reduction Project area are currently classified as white pine forest type. Clearly, the desired future condition includes expanding western white pine into a significant forest type component. Similarly, western larch-dominated cover types once occupied approximately 18 percent of the Pend Oreille basin of north Idaho (USDA Forest Service, unpublished report). The larch cover type currently accounts for only 3.8 percent of NFS stands in the Pend Oreille sub-basin and 3.3 percent of forest stands in the Gold Crown Project area. Hence, increasing the preponderance of healthy western larch in the project area would be very desirable.

Desired stand conditions on drier sites would resemble those found historically in the Pend Oreille subbasin when frequent, light, ground fires maintained open-grown stand structures, dominated by large ponderosa pine, western larch and Douglas-fir. Large, open-grown trees, with fewer young understory trees, would typify dry sites. Desired stands would have fewer trees, fewer (but larger) snags and less down woody fuels compared to now.

Environmental Consequences

Table III-1 displays the existing forest cover type and structure, as well as changes in forest vegetation predicted for both Alternative A (No Action) and Alternative B (Proposed Action) over the course of the next 20-40 years.

Table III-1. Existing forest cover type and structure compared to alternatives A and B.

Unit	Existing Forest Cover Type	Existing Dominant Stand Structure Class	No-Action Forest Cover Type	No-Action Dominant Stand Structure Class Potential	Proposed Action Forest Cover Type	Proposed Action Dominant Stand Structure Class Potential
1	Douglas-fir	small to medium	Douglas-fir/ Cedar	small to medium	Douglas-fir/ Cedar	medium to large
2	Douglas-fir/ Cedar	small to medium	Douglas-fir/ Cedar	small to medium	Larch/ white pine	large
3	Cedar	small to medium	Cedar	small to medium	Cedar/ white pine	large
4	Douglas-fir	small to medium	Douglas-fir	small to medium	Larch/ Douglas-fir	medium to large
5	Douglas-fir	small to medium	Douglas-fir	small to medium	Ponderosa pine	Large
6	Cedar	small to medium and pole-size	Cedar	medium to pole-size	Cedar/ white pine	large
7	Douglas-fir	small to medium	Douglas-fir	small to medium	Douglas-fir/ ponderosa pine	medium to large
8a	Douglas-fir	small to medium	Douglas-fir	medium	Douglas-fir/ Larch	large
8b	Douglas-fir	small to medium	Douglas-fir	medium	Cedar/ larch	large
8c	Douglas-fir	small to medium	Douglas-fir	medium	Larch	large
8d	Douglas-fir/ Cedar	small to medium	Douglas-fir/ Cedar	medium	Cedar/ White pine	medium to large
9	Cedar	small to medium and pole-size	Cedar	medium to pole-size	Cedar	large
10	Douglas-fir	small to medium	Douglas-fir	small to medium	Ponderosa pine/ Larch	large
11	Douglas-fir	small to medium	Douglas-fir/ Cedar	small to medium	Cedar/ Larch	medium to large
12a	Douglas-fir	small to medium and pole-size	Douglas-fir	medium to pole-size	Douglas-fir	large
12b	Douglas-fir	small to medium	Douglas-fir/ Cedar	medium to pole-size	Douglas-fir/ Larch	medium to large
14	Douglas-fir/ Cedar	small to medium	Douglas-fir/ Cedar	medium to pole-size	Larch/ White pine	large
15	Douglas-fir/ Grand Fir	small to medium	Douglas-fir/ Grand Fir	medium to pole-size	Douglas-fir/ Larch	medium to large
16	Grand Fir	small to medium	Grand Fir	small to medium	Larch	medium to large
17	Douglas-fir	small to medium	Douglas-fir	medium to pole-size	Douglas-fir/ Larch	medium to large
18	Douglas-fir	small to medium	Douglas-fir	small to medium	Larch	large
19	Douglas-fir	small to medium	Douglas-fir	small to medium	Larch	medium to large
20	Douglas-fir	small to medium	Douglas-fir	small to medium	Ponderosa pine/ Larch	large
21	Douglas-fir	small to medium	Douglas-fir	medium to pole-size	Larch/ Hardwoods	large
22	Douglas-fir	small to medium	Douglas-fir/ Cedar	medium to pole-size	Larch/ Cedar	large
23	Douglas-fir	small to medium	Douglas-fir/ Cedar	small to medium	Larch/ White pine	large
25	Douglas-fir	small to medium	Douglas-fir	small to medium	Ponderosa pine/ Larch	medium to large
26	Douglas-fir	small to medium	Douglas-fir/ Cedar	medium to pole-size	Larch/ White pine	large
27	Douglas-fir	small to medium	Douglas-fir	medium to pole-size	Larch/ White pine	large
28	Douglas-fir	medium to large	Douglas-fir	medium to large and brushfields	Ponderosa pine/ Larch	large
29	Cedar	small to medium	Cedar	medium to pole-size	Larch	large
30	Douglas-fir/ Cedar	small to medium and pole-size	Douglas-fir/ Cedar	small to medium and brush fields	Ponderosa pine/ Larch	large
31	Douglas-fir	small to medium	Douglas-fir	small to medium	Larch	large

Unit	Existing Forest Cover Type	Existing Dominant Stand Structure Class	No-Action Forest Cover Type	No-Action Dominant Stand Structure Class Potential	Proposed Action Forest Cover Type	Proposed Action Dominant Stand Structure Class Potential
32	Grand Fir	small to medium	Grand Fir	medium to pole-size	Grand Fir	medium to large
33	Douglas-fir	small to medium	Douglas-fir	small to medium	Ponderosa Pine	large
34	Cedar	small to medium	Cedar	medium to pole-size	Larch/ White pine	large

Alternative A—No Action

Direct Effects- No Action Alternative

Under the no action alternative, there would be no unscheduled road maintenance, road reconditioning, or road construction; no treatment of fuels; no cutting or harvest of trees; no associated precommercial thinning of young forest stands; no creation of hazardous fuel breaks; and no reforestation of desired species. Therefore, there would be no direct effects from this alternative on forest vegetation.

Indirect Effects- No Action Alternative

Indirect effects to forest vegetation would result from lack of treatment in the no-action alternative. Insect and disease-caused mortality would continue to occur throughout the project area. Hagle (2008) reported average mortality rates of approximately 20-30% per decade of Douglas-fir in root disease monitoring plots on similar habitat types in the Coeur d'Alene National Forest. Additionally, the lack of disturbance (in this case, mechanical thinning and/or prescribed burning of stands) will result in continued competition stress among plants and trees, for available water, nutrients, and sunlight. This competition stress works in conjunction with insect and disease impacts to vegetation to increase mortality rates.

Tree mortality would free individual growing space within stands, as trees die, lose their needles, and/or blow over. Shade-tolerant and fire-intolerant tree species and brush would occupy this newly available growing space, primarily because any openings created less than ¾-acre in size are generally too shaded to allow for early-seral species (ponderosa pine, larch, western white pine) germination and establishment. Furthermore, typically openings at least 6 acres (2.6 hectares) or larger are necessary to give shade-intolerant species, including white pine and larch, a competitive advantage over shade-tolerant species (Jain et al. 2004, Jain et al. 2008.) This in-growth of multiple age and size classes of shade-intolerant species would act as ladder fuels, and could make future fire suppression more difficult.

Douglas-fir and grand fir presently compete with ponderosa pine or western larch for any available growing space. As root disease-related mortality continues in the Douglas-fir and grand fir, more growing space becomes available for remnant pine and larch. However, without disturbance that specifically benefits shade-intolerant species, the regeneration of brush and shade-tolerant grand fir and Douglas-fir will proliferate. Furthermore, Douglas-fir and grand fir trees, which are highly susceptible to insects and disease, are likely to die before reaching old growth structural stages (USDA Forest Service, unpublished report; and Rockwell 1917). These conditions, coupled with high fuel accumulations from continued mortality, would make firefighting efforts more

difficult and lead to a higher risk of stand-replacing fire that would kill most trees should ignition take place (see Fire and Fuels Report).

Cumulative Effects- No Action

The added, cumulative effect of the no-action alternative on the forest vegetation resources are an impact created by considering the existing conditions (a result of past activities), coupled with future, foreseeable actions, and the no-action alternative (of not treating hazardous forest fuels in the project area.)

As stated already, the no-action alternative would indirectly influence the continuance of the trend for widespread root-disease and insect mortality in Douglas-fir and grand fir, a slow decline in shade-intolerant species, and a general increase in the risk of a landscape level, stand-replacing wildfire event.

When coupled with foreseeable, future actions including the need for continued fire suppression in this wildland-urban interface, further development of private land within the project area, and the maintenance or increase in recreational use levels, many potential cumulative impacts should also be considered. Furthermore, we must assume that in the absence of disturbance, the natural ecological processes in the forest would continue, including stem exclusion, forest insect and disease pathogens, tree mortality, and additional accumulations of coarse woody debris as trees die and fall over. The increased private land development and continued or increased recreational use in the area could increase the number of human-caused wildfire ignitions and further influence the forest vegetation across the project area. Therefore, the cumulative effect would potentially also amplify an increased risk of a landscape-level, stand-replacing wildfire event, as well as the associated widespread disturbance to existing vegetation cover types that such a wildfire would produce. In essence, a large portion of the project area could be regenerating or “starting over” from square one. With such an event, not only would widespread vegetation cover type changes occur, but there would also be potential effects to soil physical properties and productivity, which could potentially negatively influence forest vegetation.

Alternative B—Proposed Action

Direct & Indirect Effects- Proposed Action

The proposed combination of thinning, thinning with group selection harvests, overstory removal, regeneration harvest, reforestation, and special hazardous fuels treatments in Alternative B would increase the acres within the project area dominated by long-lived, seral tree species (Table III-1, Table III-2). Thinning practices would focus on removal of smaller diameter trees and those species or individuals most susceptible to pathogens in the area. Larger diameter trees and preferred, seral species would be favored for retention. As both a direct and indirect result of the proposed action, areas dominated by ponderosa pine would increase dramatically, western larch cover types would increase by approximately 354%, and white pine cover types would increase by approximately 238%. These changes would trend forest stands on NFS lands in the project area towards the desired future condition.

Table III-2. Summary of forest cover type existing conditions compared to Proposed Action (Alt. B)

Forest Cover Type (acres)	Existing Condition	Alternative B	Proposed Change (Acres)	Proposed Change From Existing (%)
Birch/Hardwoods	0	8	+8	+800%
Western redcedar	422	397	-25	-6%
Douglas-fir	1698	1348	-350	-21%
Grand fir	92	87	-5	-6%
Western larch	108	383	+275	+354%
Ponderosa pine	0	59	+59	+5900%
White pine	59	141	+82	+238%
Non-forest	14	14	0	0%
Other NFS land	896	896	--	--
Project Area- Total	3,288	3,288		

The proposed action would also increase the acreage of hardwood cover types. Moreover, hardwood species such as birch, aspen, rocky mountain maple, and/or red alder would likely establish or re-establish a presence in regeneration harvest areas and those treatment areas which will be broadcast burned (as burning tends to rejuvenate hardwood sprouting.)

Indirectly, the increased vegetative diversity provided by the proposed action, would improve resistance to and resilience from insect and disease pathogens, fire, and climatic variability. The proposed action would also enhance wildlife habitat variety (See wildlife section).

Blister-rust-resistant western white pine seedlings would be planted in regeneration harvest treatment areas. Planting of larch and ponderosa pine seedlings, which are more resistant to root disease and tolerant of fire than Douglas-fir and grand fir forest cover types, would also enhance forest diversity and increase management options, trending forest cover types towards more historic conditions.

The fuels treatments would focus on removing smaller size class trees, as well as those species most susceptible to the insect and disease pathogens in the area. Such harvesting would also remove trees competing with fire-surviving relics. Many natural openings would be restored to approximately their historic size. Treatments would increase protection of remnant trees and stands from fire.

Stand structures resulting from the 573 acres of proposed treatments (thinning, thinning with group selection harvests, overstory removal, regeneration harvests, special treatments-hazardous fuels, coupled with slash treatments through grapple-piled slash, excavator-piled corridors, or broadcast burning) would have reduced fuel loading, lower canopy density and reduced horizontal and vertical fuel continuity. These changes in fuel characteristics would result in less intense fire behavior and make a fire easier to control (See Fire and Fuels Report).

Direct effects to forest vegetation as a result of proposed road maintenance or road reconditioning activities are not expected. However, some direct effects to forest vegetation as a result of the proposed new, permanent road construction (2.2 miles) and

new, temporary road construction (0.13 mile) are anticipated. Direct effects in these areas will be the approximate number of acres (either permanently or temporarily) taken out of the productive land base and placed under a road prism. For proposed, permanent road construction, this equates to approximately 3.7 acres of land currently associated with forest vegetation being cleared and permanently taken out of the productive land base in the project area. When considering the size of the project area and the need for future management of both the forest vegetation resources and hazardous fuels in the area, this affected acreage is insignificant.

When considering proposed, temporary road construction, this equates to approximately 0.2 acre of currently productive land base being cleared of vegetation. Again, this acreage is an insignificant effect when compared to the size of the project area and productive land base. Once the temporary road is decommissioned, there would be no lasting effects to the forest vegetation resource, as plants and trees can be re-established on the site.

Cumulative Effects- Proposed Action

The effects of the proposed vegetation treatments and road construction, reconditioning, and maintenance are expected to be localized to the proposed treatment units and affected area of new road construction. Therefore, the proposed actions do not individually or cumulatively affect vegetation outside of the project area. Activities on private, state, or other federal lands in the project area have also been considered within the past, present, and future foreseeable activities (see project file). The discussion in the "Existing Condition" section of this document is a determination of the cumulative effects to the forest vegetation resource in the project area, resulting from past and ongoing activities. The past disturbances, activities, and natural occurrences have led to the existing condition.

The level of effects of each type of activity has the potential to vary due to location and implementation standards that guided the activity at the time. The following describes the effects each activity had, is having, or is expected to have on forest vegetation. A complete list of past and future foreseeable activities is located in the project file. Only the following past, present, and foreseeable actions that have been determined to have a cumulative effect on forest vegetation resources, when combined with the proposed action- alternative B, are considered here.

Timber Sales Prior to 1940

While little information about these activities exists, it is known that the Palmer Brothers' sale of 1935 to 1940 involved the salvage of blow-down trees in the Grouse Mountain area. It is likely that these small sales removed both sound snags, and valuable remnant large trees. If they hadn't been removed, these trees and snags would likely have contributed to stand structural and species diversity in the project area today. Additionally, within the project area, there is also evidence of past salvage activity in the Gold Gulch drainage. During walk-through examinations, high-stumped fire snags were clearly salvaged. No obvious skid trails in the area of this salvage activity were observed. Therefore, although there is no past record of this activity, sound reasoning suggests that this salvaging was probably performed after the last large fires in the area. Furthermore, the activities seem to have either been performed with horse logging or were potentially

skidded or hauled downhill over snowpack to the Bottle Bay Road or Lake Pend Oreille (based on the lack of visible skid trails.) The vegetation treatments proposed in the Gold Crown Fuels Reduction Project would not add to any lingering structural or compositional effect of these historic harvests or salvage activities because the Gold Crown FRP is favoring retention of all large, relic trees and snags.

Gold Hill Timber Sale (1995)

The Gold Hill Timber Sale (GHTS) occurred within the localized area of proposed treatments for this project. In fact, some of the current, proposed treatments were developed to improve upon some of the activities which occurred with the Gold Hill Timber Sale. For instance, portions of proposed units 1, 8d, 10, 19, 22, 23, and 29 occur within previously treated portions of the Gold Hill Timber Sale. GHTS group selection harvests occurred west of proposed unit 6, and another shelterwood regeneration treatment occurred between the proposed units 18 and 14.

The portions of the Gold Hill Timber Sale which occurred within proposed units 1, 8d, 10, 19, 22, and 29 were very lightly thinned, with individual tree marking. During the Gold Hill Timber Sale, hazardous fuel reduction was not considered a purpose, nor was it achieved. Trees removed in these areas during the Gold Hill Timber Sale consisted largely of disease- or insect-infected grand fir, Douglas-fir, hemlock, and white pine.

The portion of the Gold Hill Timber Sale which occurred within unit 23 was the first stage of a two-stage process. During the Gold Hill Timber Sale, that unit was harvested as a shelterwood regeneration harvest, followed by planting of early seral species, including western white pine and western larch. Natural regeneration of western hemlock, cedar, grand fir, and Douglas-fir also established following the project. Now, this 6-acre stand has overstory trees which need to be removed (second-stage) to increase the available sunlight, water and nutrients for the understory trees. Furthermore, dense sapling-size trees in the understory also need to be precommercially-thinned, so that the residual trees may continue to be healthy and vigorous.

Overall, the only cumulative effect of the Gold Hill Timber Sale and its associated reforestation activities to the proposed Gold Crown Fuels Reduction Project would be that reforestation activities within GHTS helped move approximately 48 acres of forest stands back to early successional stages, favored longer-lived seral species in those specific forest stands, and reduced some hazardous fuel accumulations in the immediate area of harvest activity. The vegetation treatments proposed in the Gold Crown FRP would result in beneficial effects when considered cumulatively with the Gold Hill Timber Sale.

Grouse Mountain Sagle Timber Sale (1987)

The Grouse Mountain Sagle timber sale occurred within a very small portion of the Gold Crown FRP project area, specifically within the E1/2 NE1/4 of section 20 and the extreme W1/2 NW1/4 of section 21, Township 56 North, Range 1 West of the Boise Meridian. This timber sale did not occur within any portion of the proposed treatment areas of the Gold Crown FRP. Overall, the Grouse Mountain Sagle timber sale and reforestation activities helped move some forest stands back to early successional stages, favored longer-lived seral species in those specific forest stands, and reduced hazardous fuel accumulations in the immediate Grouse Mountain area.

Shelterwood harvesting followed by planting western larch, western white pine, and ponderosa pine improved some forest stands' resistance to root disease. The trees planted following the Grouse Mountain Sagle timber sale are now sapling size and will likely develop into a resilient, sustainable forest cover. The large trees remaining in those harvest units contribute to stand structure in the form of large-diameter green trees and future snag replacements.

The regeneration harvest proposed under the Gold Crown FRP is similar to the Grouse Mountain Sagle Timber Sale in that regeneration of longer-lived seral species and retention of large-diameter green trees would be favored. However, the proposed treatments would differ in their incorporation of untreated areas and in their retention of snags and large down woody debris. The vegetation treatments proposed in the Gold Crown FRP would result in beneficial effects when considered cumulatively with the Grouse Mountain Sagle Timber Sale.

Big Grouse Timber Sale (1997)

The Big Grouse timber sale (BGTS) occurred within a very small portion of the Gold Crown Fuels Reduction Project area. However, the BGTS utilized a variety of harvest methods and had positive effects on both species composition and forest structures. All harvest methods retained abundant overstory structure, generally of preferred species, as well as pockets and stringers of untreated areas throughout harvest units. These retention trees will continue contributing structure and species diversity of the areas that were harvested.

Approximately 28 acres of commercial thinning within the BGTS occurred within the Gold Crown FRP area. This commercial thinning promoted and maintained long-lived ponderosa pine and western larch. Also, prescribed burning and piling of slash effectively reduced hazardous fuels.

As the proposed activities would have positive effects on forest vegetation, and because the Big Grouse timber sale had beneficial effects on forest vegetation, cumulative effects of these activities would be positive.

State Timber Harvest Operations

In the summer/fall of 2008 Idaho Department of Lands is planning to start a thinning and regeneration harvest project on approximately 105 acres, located in the southern half of section 3, Township 57 North, Range 2 West of the Boise Meridian. Within the regeneration unit (approximately 15 acres), early seral species will be favored for reforestation. The thinning (approximately 82 acres) will favor removal of decadent or disease/insect-infested trees. Such treatment will certainly support a slight trend towards the desired forest vegetation conditions in the project area.

As the proposed activities would have positive effects on forest vegetation, and because the timber harvest on State land would also have positive effects on forest vegetation—trending forest stand structures and species composition towards more historic conditions—the cumulative effects of the two actions would be positive with respect to the forest vegetation resource in the project area.

Private Land- Timber Harvest Operations

Timber harvest on private lands occurs sporadically throughout the project area. Most timber harvests on private lands tend to be partial cuts that remove trees of the highest economic value (usually the largest) and typically removes large, fire-resistant seral species. Other private timber harvests may focus on providing openings for development or creating desirable views from homesites. In either case, natural regeneration is typically relied on to re-forest created openings. This tends to favor shade-tolerant species such as Douglas-fir and grand fir, over early-seral species such as ponderosa pine, western larch, and western white pine. With increased values for private timber, and historic harvest practices on private lands, historic vegetation patterns may never be reestablished on private lands near the project area.

Stimson Lumber Company is planning a 200-acre timber sale within their lands located in section 6, Township 56 North, Range 1 West of the Boise Meridian, likely to occur in late 2008. Type of harvest or silvicultural prescription is unknown at this time. However, Stimson thinned these same stands approximately 15 years ago, so the likely intent will be to regenerate these stands during this entry. In that case, efforts to invest in reforestation of fire- or disease-resistant seral species should not be assumed. We cannot consider that this timber sale will help trend forest vegetation resources in the project area towards the desired condition.

The trends caused by timber harvest on private lands would be towards shade-toleratnt species and away from historic conditions. Therefore, such activities could add cumulatively to the no-action alternative, which also exhibits a trend away from historic conditions. However, the proposed action would accomplish the opposite—trending forest stand structures and species composition towards more historic conditions. Consequently, the effects of the proposed activities on forest vegetation resources are not expected to add cumulatively to the effects of timber harvest on private lands.

Private Land- Defensible Space programs

Approximately 19 defensible space projects (through the BONfire program) have either been accomplished or are in process within the project area. These programs, while beneficial to individual private structure defensible space, do not significantly affect forest vegetation. Defensible space projects typically focus on clearing shrubs, debris, and small trees, as well as pruning larger or more desirable trees, for an approximate 100 – 150 foot radius around homes. As such, they do not have significant direct or indirect effects on forest vegetation. Therefore, there are no cumulative effects of these projects when considered with the proposed action alternative.

Private Land- Development

As stated earlier, continued development on private lands in the project area will take more and more land out of the productive land base. Developments tend to clear openings within the private property blocks, whether for homesite development, creation of vistas, or “open, park-like space”. However, in either case, such activities, followed by a lack of planned reforestation, tend to favor shade-tolerant species. Therefore, when considered with the proposed action, private development will not help trend the forest vegetation

within the project area towards the desired conditions and therefore will not have a cumulative effect on forest vegetation.

Road Construction

The construction of system roads in the project area has removed a relatively minor amount of land from the forest land base. Past road construction resulted in minimal direct effects to forest vegetation with regard to stand species composition or structure. Road construction in the project area has facilitated recent management of forest vegetation that favors desirable forest cover types and structures. The presence of roads also increased future management options, including the likelihood of establishing and maintaining desired forest structures and species compositions. Roads have also created better access for wildfire suppression efforts.

Considered cumulatively with the effects that the existing system roads have had on the productive forest land base, the proposed fuel reduction treatments, system road construction, road reconditioning, and road maintenance would have an insignificant effect on forest vegetation because it would remove only a minor amount of land from the productive base. Additionally, in terms of facilitating the management of healthy forest vegetation, the effects of the proposed construction on the forest land base would be offset by the benefits derived from its construction.

Fire Suppression

Fire suppression has basically removed one of the few natural disturbance regimes from the forest stands in the project area. As a result, stands have not been “thinned” by fire and have tended to become crowded and overstocked with more shade-tolerant species. Continued suppression will advance many untreated stands toward domination by shade-tolerant, climax vegetation. The existing long-lived seral species would eventually be shaded out and replaced by species such as grand fir and cedar on more moist sites, and Douglas-fir on dry sites, in the absence of a stand-level disturbance. Forest fuel loading has also increased as crowded stands result in tree mortality and accumulations of coarse woody debris on the ground.

The proposed activities are designed to reduce the risk of a landscape-level, stand-replacing wildfire event and improve chances for future successful fire suppression, through the manipulation of forest structure and species composition. Additionally, in some forest stands the proposed activities would restore the role of fire as an ecological process both in the near and distant future. Consequently, the effects of the proposed activities are not expected to add cumulatively to the effects that past, present, and reasonably foreseeable future fire suppression create.

Firewood Gathering

This activity has the potential to reduce coarse down woody material, snags, and fuels along open roads, but effects at the project area scale would be negligible because only a small portion of the area is accessible from roads. The proposed road construction is either temporary in nature, or in the case of the proposed system road construction, would be restricted to non-motorized use and be placed into storage following the project

implementation. Therefore, the amount of the project area available for firewood gathering and the corresponding quantities of firewood gathered would remain relatively constant. As the proposed activities are not expected to increase the amount of firewood gathered in the project area, they are also not expected to have an incremental impact on the environment when added to other past, present, and reasonably foreseeable firewood gathering.

Monitoring and Treatment of Noxious Weeds

Noxious weed treatment, as conducted under the guidelines established under the Sandpoint Ranger District Noxious Weed Control Project EIS (USDA Forest Service 1998b), would have little effect on forest vegetation. Under the guidelines of the EIS, chemical treatments are used with restrictive protective measures to minimize damage to trees and other native vegetation. Therefore, there would be no cumulative effects of these activities with the proposed action.

Timber Stand Improvement (TSI)

Timber stand improvement (TSI) includes thinning and pruning in plantations. Thinning small-diameter trees reduces stand densities promoting continued tree growth and favoring the healthiest trees. More nutrients, which are critical to growth and defense mechanisms, are redistributed to uncut trees. Promoting healthy, growing trees adaptable to disturbance helps reduce the risk of insect and disease epidemics while providing land managers a variety of options for future management. Pruning white pine can also help reduce susceptibility to blister rust infection. Future TSI activities are likely to occur in the old plantations created by the Gold Hill (1995) timber sale areas, as well as new plantations created by the proposed regeneration harvests within the Gold Crown FRP, and would have the positive effects outlined previously. Therefore, logic dictates that the cumulative effects of the proposed action and reasonably foreseeable TSI activities would be beneficial to the forest vegetation resource.

Recreational Use

These activities have not, nor are they expected to have, significant effects on forest vegetation. Therefore, there would be no cumulative effects of the proposed action with these activities.

Compliance with the Forest Plan and Other Regulatory Direction

Because Alternative A (No Action) would result in no trees being harvested, no fuels treatments being performed, and no road work being performed in the project area, Alternative A would be consistent with Idaho Forest Practices Act, National Forest Management Act (NFMA) of 1976, and National Environmental Policy Act (NEPA) of 1969. However, Alternative A (No Action) would not be consistent with the Multiple-Use Sustained Yield Act of 1960 and Forest and Rangeland Renewable Resources Planning Act of 1974 because the No Action alternative does not provide for continued sustainable forest products from the project area and does not ensure 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."

Alternative A (No Action) would not be consistent with Forest Plan objectives that specifiy promoting stand structures and species composition which reduce susceptibility to insects and diseases (USDA Forest Service 1987, p. II-32, (4)).

Alternative B (Proposed Action) is consistent with the Idaho Forest Practices Act, the Multiple-Use Sustained Yield Act of 1960, the Forest and Rangeland Renewable Resources Planning Act of 1974, the National Forest Management Act (NFMA) of 1976, the National Environmental Policy Act (NEPA) of 1969, and all Idaho Panhandle National Forests 1987 Forest Plan direction related to forest vegetation resource. The specific Forest Plan standards are referenced below. In addition, all Forest Plan standards pertaining to management of old growth stands were met or exceeded (see Old Growth Consistency Report in project file.)

Proposed regeneration cutting followed by planting of seral tree species less susceptible to insect and disease damage including rust-resistant western white pine, is consistent with Forest Plan direction that "reforestation will normally feature seral tree species" (USDA Forest Service 1987, p. II-32). All stands proposed for regeneration cutting are on lands suitable for timber production that can be adequately restocked within five years of the final cut. As directed by the Forest Plan, stands would be regenerated with trees from seed that is well adapted to the specific site condition, and would be regenerated with a variety of species (USDA Forest Service 1987, p. II-32).

Site-specific silvicultural prescriptions are compatible with management area goals, and preferred species management has considered both biological and economic criteria (USDA Forest Service 1987, II-32). Silvicultural practices including cutting, site preparation and planting with seral species are designed to reduce the perpetuation of pest problems (USDA Forest Service 1987, pp. II-37 and II-38).

Management of competing understory vegetation would be accomplished, where necessary, as a consequence of fuels reduction/site preparation treatments (USDA Forest Service 1987, p. II-38).

Fire and Fuels

Affected Environment

Existing Condition

The types of fires that occur in forested ecosystems (Zack and Morgan 1994; p.19-22) include:

- Nonlethal fires – fires that kill 10% or less of the dominant tree canopy. A much larger percentage of small understory trees, shrubs and forbs may be burned back to the ground line. These are commonly low severity surface and understory fires, often with short return intervals (a few decades).

- Mixed Severity fires – fires that kill more than 10% but less than 90% of the dominant tree canopy. These fires are commonly patchy, irregular burns, producing a mosaic of different burn severities. Return intervals on mixed severity fires may be quite variable.

- Lethal fires – fires that kill 90% or more of the dominant tree canopy. These are often called "stand-replacing" fires and they often burn with high severity. They are commonly crown fires. In general lethal fires have long return intervals (140 to 250 years or more apart), but affect large areas when they do occur. Local examples of these types of fires would be the Sundance and Trapper Peak fires of 1967 that burned over 80,000 acres in a relatively short time period during late summer drought conditions.

In 1994 Zack and Morgan completed a fire history study on two forested landscapes in northern Idaho, one in the Coeur d' Alene River basin and the other north of Bonners Ferry. Due to the proximity to the project and similar habitat types this study was used to make assumptions on historic fire frequency and severity within the Gold Crown project. The number of lightning fires regularly experienced in northern Idaho accounts for a disturbance regime that includes regular major wildfires (Zack and Morgan 1994). Fire suppression has effectively excluded most wildland fires since the 1930s. This has eliminated the underburns and mixed-severity fires, which served as the thinning agents that favored dry habitat type legacy trees (larch and ponderosa pine). The changes to western warm dry forests have been well documented. Keane et al. (1990, p.190)states:

Figure III-4. Evidence of past fire within stand # 65402003

> *"Before 1900 most of these forests, experienced frequent surface fires that maintained open, park-like stands of ponderosa pine, and western larch on moist sites, along with lesser amounts of Douglas-fir, grand fir and lodgepole pine (Arno 1980, Gruell et al. 1982, Martin 1982, Gruell 1985, Steele et al 1986). Most areas have had few if any fires during the past 70 years and, as a result, the more shade tolerant Douglas-fir and Grand fir have increased in numbers, often forming dense understories of dense immature stands arising after past logging activities (Weaver 1967, West 1969, Arno 1976, Steele et al. 1986)."*

Harvey (1994, p.87) states:

> "With effective exclusion of natural underburning in this century, dry forests quickly became over-stocked, often exceeding carrying capacity. In the absence of fire, native insects and pathogens regulate stocking by killing susceptible individuals and species. Frequent underburning also prevented excess accumulation of carbon and nutrients in woody biomass (Harvey 1994, Mutch

1994). The balance between fire and biological decomposition in regulating carbon accumulations in these forests has been disrupted (Olsen 1981). A current danger is stand-replacing wildfire with fuel accumulations so high that burns are extremely hot, resulting in critical reductions of stored nutrients, with accompanying losses in potential productivity (Harvey et al. 1994a). The effectiveness of fire prevention and suppression has permitted increased ground-fuel accumulations and stratified fuels (both living and dead) to the point where many fires cannot be easily contained or confined. They now burn hotter and more extensively than 10 years ago (Auclair and Bedford 1994, Baker 1992, Brown 1983). This effect has been especially evident in dry forests that historically experienced fire every 5 to 25 years (Mutch 1994)."

The Gold Crown area includes the following habitat type groups for this analysis:

- **Dry habitat types** (266 acres) consist primarily of ponderosa pine, western larch, Douglas-fir, and grand fir. Prior to effective fire suppression, many stands in these forest types were burned frequently by low- or mixed-severity fire; occasional stand-replacing fires also occurred. Where fires occurred at relatively short intervals (less than 25 year), they were mainly non-lethal. Stands comprising all age structures were the result of non-lethal fire regimes, even-aged structures were the result of fire regimes with a combination of both non-lethal and severe fire patches (Smith and Fischer 1997, pp. 56-57).
- Moist habitat types (306 acres) are dominated by a mixture of conifer species (western red cedar, western hemlock, western larch, Douglas-fir, grand fir, western white pine, lodgepole pine, etc). These are the most common forest types on mid-elevation sites in the mountains of the northern Idaho Panhandle. Prior to the introduction of blister rust, when white pine was a dominant species, this was known as the "white pine type." These forests are very productive and prior to European settlement tended to accumulate large amounts of biomass (the collection of all living plants in a forest) in the relatively long intervals (average 200+ years) between stand-replacing fires. Sometimes, low severity fire occurred two to three times as often as either moderate- or high-severity fire (Smith and Fischer 1997, pp. 99, 102-104). Because pre-settlement intervals between severe fires were generally long in these forests types, the effects of fire exclusion are subtle. However, exclusion of low- and mixed- severity fires over the past 90 years has reduced ecological diversity and increased homogeneity (stands of similar size, age, species composition, structure, etc.) across the landscape (Smith and Fischer, 1997, p 108).

Historic fire regimes in moist habitat types were variable and consisted of long-interval, large, lethal fires mixed with shorter return interval, nonlethal, and mixed-severity fires. The dry forest types within the project area are scattered among larger areas of moist types. These types historically burned more frequently with nonlethal and mixed-severity fire (Smith and Fischer 1997 p. 56-57, 91-92).

Gold Crown Area Fire History and Occurrence

Lightning and humans are the source of fire starts in the Sandpoint Ranger District. The location of fires in the Sandpoint Ranger District have been recorded and mapped for

approximately 130 years. The last major, recorded fire to burn within the Gold Crown project area occurred in the 1920's. Forest Service records show that at least eight fires have been suppressed within the last fifteen years in the Gold Crown project area (see project file). Several other fires have been suppressed adjacent to the project area.

Today the risk of lethal stand-replacement fire in the Gold Crown project area is increasing due to accumulated fuel loads. At the same time, adjacent development has increased, and with it the risk of human-caused ignitions also increases. In the absence of nonlethal fires, both ground and ladder fuels are increasing due to tree growth, normal tree mortality, excessive root disease, and beetle-caused mortality. These factors are affecting moist and dry forest habitat types.

Existing Fire Hazard and Fire Behavior

Fire regimes are identified by the interaction of fire with the environment, the number of fire occurrences and the frequency at which these occurrences take place. The fire regime indicates the frequency or fire return interval and the type of fire severity that is considered *typical*. Each fire regime has three condition classes that have been developed to categorize the current ecological condition as defined in terms of departure from the historic fire regime. Condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, grazing, introduction and establishment of exotic plant species, insects and disease (introduced or native), or other past management activities. As the condition class number increases a greater deviation is indicated with the associated greater risk of the loss of key biological elements found within the system.

Table III-3. Description of Fire Regime Condition Classes

Fire Regime Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) is low.
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate; Risk of loss of key ecosystem components is moderate.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

Fire regimes within the Gold Crown Project area were determined using two habitat types, dry and moist. Dry habitats are primarily south aspects or exposed points and ridges where ponderosa pine or Douglas fir is the climax species. Dry habitats fall into Fire Regime I. Moist habitats are generally more northerly aspects or draws, and host a variety of species such as western larch, white pine, grand fir, Douglas fir, and western red cedar. The most dominant climax species on moist sites in the Gold Crown Project area is western red cedar. The moist habitats fall into Fire Regime III.

Fire Regime Definitions:

I – 0-35 year frequency and low surface fire most common to mixed severity (less than 75% of the dominant overstory vegetation replaced).
II – 0-35 year frequency and high severity (greater than 75% of the dominant overstory vegetation replaced).
III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced).
IV – 35-100+ year frequency and high stand replacement severity (greater than 75% or overstory vegetation replaced).
V – 200+ year frequency and high stand replacement severity.

Habitat	Fire	FRCC	Acres	%
Dry	I	2	266	47
Moist	III	3	306	53

The Fire Regime Condition Class (FRCC) Analysis for the Gold Crown Project area showed that the landscape as a whole is in Condition Class 2, and is in need of restoration of fire effects, vegetation composition/structure and fuel characteristics. The departure from natural fire frequency and severity and the departure from natural vegetation composition/structure, and fuel characteristics influenced the dry and moist habitat types. Fire exclusion, white pine blister rust, and timber harvest not mimicking the natural fire regime are primary factors pushing the Condition Class rating into Condition Class 3 in localized moist habitats.

The BehavePlus 3.0 surface fire model was used to estimate the potential fire intensity of the Gold Crown project area, given the existing stand structure. Although the part of the project area is classified currently as Fuel Model 8, many stands within these areas are moving into the fuel model 10 with localized portions currently being rated as fuel model 10. Due to the increase of insect and disease, fire exclusion, increased competition for nutrients and water from overcrowded stands, and the loss of key ecosystem components, such as Western White Pine, further departure from fuel model 8 is expected. In fuel model 10, fires burn in the surface and ground fuels with greater intensity than the other timber litter models. Crowning, spotting, and torching of individual trees is more frequent in this fuel model leading to potential fire control difficulties. (Anderson 1982). This is due to the amount of 1, 10, and 100-hour fuels present, which under the right conditions (high temps, low relative humidity, etc.) are receptive and will carry a fire.

Table III-4. Existing potential fire behavior.

Fuel Model	Surface Fire Flame Length (feet)	Rate of Spread*	Fireline Intensity Surface**
8	5.5	1.9	23
10	21	8.3	563

* Chains per hour, (66 feet equals a chain).
**BTUs/ft/sec. See Table 8 for further clarification.

Under the existing condition, fire behavior modeling suggests that, should a wildfire occur during extreme fire danger conditions (97th percentile weather), high-intensity fires would take place in fuel models 10 (Table III-5). Control problems would exceed the capability of hand crews resulting in the need for indirect suppression strategies to be employed, resulting in a greater area burned (see figure III-5).

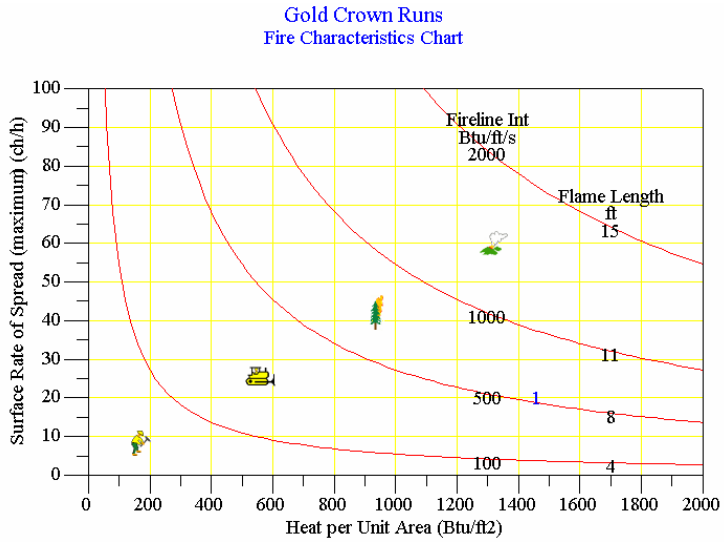

Figure III-5. Fire Characteristics chart.

Compared to surface fires, crown fires exhibit higher spread rates and flame lengths. A crown fire increases the threat to firefighters, public safety, and increases the threat of property loss (Scott and Reinhardt. 2001, p. 1). BehavePlus 3.0.1 was also used to model crown fire initiation. Flame lengths are indicators of potential fire intensities, but cannot be used alone to determine the effectiveness of the proposed treatment. The less distance between the base of the tree canopy and the ground surface, the less surface flame length is required to initiate and sustain a crown fire (Figure III-6). This is referred to as Canopy Base Height. Canopy Base Height is used along with flame lengths to determine the potential for a surface fire to spread into the tree crowns. As the potential for a crown fire increases suppression efforts become more difficult or ineffective.

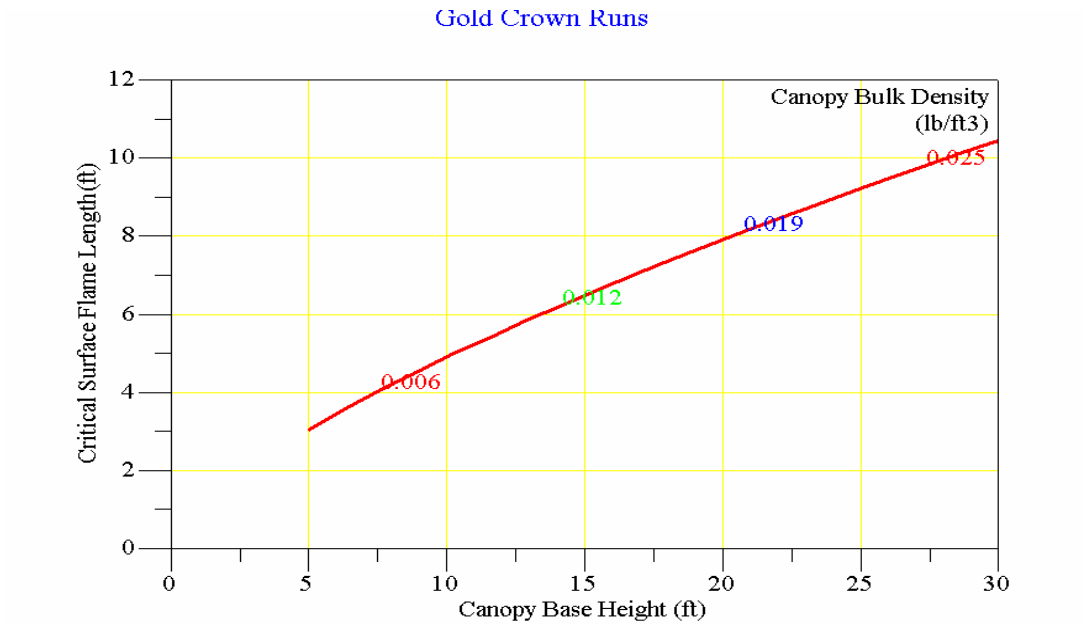

Figure III-6. Canopy base height as compared to potential flame length needed to initiate a crown fire. The line depicts the potential point of transition from surface fire to crown fire given the right weather factors (97th percentile).

Fire exclusion in fire-adapted ecosystems can cause many changes in vegetation and potential fire behavior, which are well documented. Large, stand destroying, lethal wildfires, which were historically rare in the open dry habitat type ponderosa pine forests, have become common in the dense stands that have developed as a result of fire exclusion. These dense stands provide abundant fuel ladders that allow fires to increase in intensity and burn explosively through the tree crowns (Arno et al. 1996, p. 114). The increased potential for crown fire as a result of fire exclusion is of concern to fire managers, particularly when the conditions exist adjacent to communities. Crown fires are the most difficult to suppress and as a result are more likely to become large. The Gold Crown project area is surrounded by private land and homes, and a large, uncontrolled fire would be a threat.

To date, 19 defensible space projects have either been completed or are in process around private structures within the project area. Such projects do indeed increase the defensibility of those treated homes when faced with a wildfire threat; however, such treatments have been shown to even have a greater protection benefit if combined with landscape fuel reduction treatments. In addition, when considering that over 300 structures are currently within the project area and only 19 have been treated, much remains to be accomplished.

Environmental Consequences

Alternative A – No Action

Direct and Indirect Effects

Alternative A would not result in any direct effect or change to forest fuels. No fuels reduction treatments would be implemented.

In the absence of any kind of human-caused or natural disturbance, indirect effects would occur from the natural progression of forest growth and change. Vegetative conditions, fire behavior, and fireline intensity as described in the existing condition section would persist.

Figure III-7. Accumulating surface fuels due to competition, insect, and disease. Stand #65402002.

Over time more fuels would accumulate as trees continue to succumb to insects and disease, increasing the continuity of surface fuels, increasing ladder fuels, and thus lowering the gap between surface fuels and the canopy. The shade intolerant understory would continue to grow and replace the overstory as it falls to the forest floor, increasing the continuity of the canopy. The rate of spread and flame lengths in this situation would increase: combined with the ladder fuels, lowered canopies, and the continuity and densities of the canopy, the potential for sustained crown fire would be increased. High flame lengths and fireline intensities directly affect our ability and strategies to suppress wildfires.

Cumulative Effects

The cumulative effects analysis area encompasses all of the federal, private, and other lands that could burn into or out of the project area in any single fire event. This area is not definable on a map, because determining how large or how far a fire would travel is dependent on a number of variables including fuel conditions, temperature, relative humidity, wind, topography, and many others that cannot be determined until an ignition occurs. An example of this is the Sundance Fire of 1967, which traveled more than 16 miles and engulfed more than 50,000 acres, mostly within a nine-hour time frame (USDA 1968).

Under the No Action Alternative, wildfires in the analysis area would continue to be suppressed. Therefore, fuels would continue to accumulate through forest succession processes and fire behavior would continue to trend away from historic conditions, creating an increasing challenge to fire suppression forces. Fires would tend to burn with more intensity over time, potentially becoming more dangerous and destructive. Forests where root disease is an increasing problem would also contain more snags, which are particularly dangerous for firefighters. Larger, more intense fires that threaten nearby homes and communities could have various unwanted effects (evacuations, threatened, and burned structures, adverse health effects from smoke). With the increasing developments within and adjacent to the project area, the cost of a large-scale wildfire could potentially be devastating, whether it be the risk to human life or real property. Within the project area the majority of ignitions occur due human actions; with the

increase of use of this area and increased development the likelihood of human ignitions is expected to increase.

Because of the private property values and public infrastructure like utility lines, wildfires would continue to be suppressed in the project area. By allowing fuels to continue accumulating, the No Action Alternative would contradict the goals of the National Fire Plan (*www.forestsandrangelands.gov/*) to reduce hazardous fuels and restore fire-adapted ecosystems.

Several timber harvests prior to 1940 are suspected to have occurred of fire killed snags; from the height of stumps, locations, and the lack of excavated trails or roads, trees may have been removed using horse logging systems and skidded down draws during the winter. While little is known about them, harvests likely removed standing, large, fire-killed species like ponderosa pine and western larch. Over a half-century later, the fuel reduction benefits that may have occurred have been long since overshadowed by natural vegetative growth, mortality, and subsequent fuels accumulation.

Forty-eight acres of shelterwood harvest and one hundred and seventeen acres of group selection were completed in 1995 during the Goldhill Timbersale. Within a few years, these young stands would likely be precommercially thinned. This combination of harvest, slash treatment, planting and subsequent thinning are taking these stands toward historic conditions when wildfires tended to have lower intensity fires.

Adjacent private forestland is a mixture of heavily harvested areas with follow-up fuel treatments, to houses surrounded by dense untreated forest. This spectrum of fuel conditions suggests some private property values are relatively safe from potential wildfire damage while others are very vulnerable.

By pursuing Alternative A, no action:

- fuel accumulation would continue in the proposed project area
- nearby young plantations would be somewhat vulnerable to damage from wildfire spreading from the proposed project area into the plantations
- fire access in the proposed project area and along private property boundaries would remain unchanged
- nearby private property values would experience increasing susceptibility to damage from wildfires spreading onto private land from the proposed project area or from other private lands, depending on the location of the ignition, as fuels continue to accumulate

Alternative B – Proposed Action

Carrying out this alternative would effectively reduce flame lengths, lower existing fuel concentrations, decrease ladder fuels (brush and small trees), and increase the chance of successfully suppressing wildfires should they occur. Any fire starting in the project area or entering the project area would have a higher probability of being confined to the ground, affording a high probability of control using engines, hand crews, and air tactical resources. A wildfire would be substantially less severe and of lower intensity, as well as less expensive and safer to suppress than under current conditions.

Potential loss or damage of private property and resources from a fire burning in the project area, and then spreading into adjacent private lands would be reduced.

Direct and Indirect Effects

Modeling was conducted to determine potential fire behavior characteristics before and after treatment. Table III-6 provides estimated potential wildfire behavior outputs for the fuels models represented in the project area, and the analyzed change in fire behavior characteristics related to the desired condition. After treatment, those areas represented by fuel models 10 would be better characterized by fuel model 8; a fuel model more conducive to fire suppression. Not all acres would be converted due to untreated riparian and sensitive areas within the stands.

Table III-5. Post-treatment fire potential

Fuel Model	Surface Fire Flame Length (feet)	Rate of Spread*	Fireline Intensity Surface**
8	5.5	1.9	23
10	21	8.3	563

* Chains per hour, (66 feet equals a chain).
**BTUs/ft/sec.

Proposed treatments would change the quantity and continuity of fuels. Within the treated areas, fire behavior modeling indicates that fireline intensity and flame length would be reduced. Essentially, treatments would transition areas that would currently burn as Fuel Model 10 to burning as more like Fuel Model 8. Thinning from below would reduce stand density. Removal of dead and dying trees would reduce actual and potential surface fuels available to burn under high-intensity fires. Treatments would also increase stand vigor by making the soil, water, and nutrients available to fewer trees left in the residual stand (Graham 1999, p. 20). This would result in healthier trees and less future mortality from insects, disease, and wildfire, which contribute to future high fuel loadings.

Depending on the size, number, spacing, and species of reserve trees, stands that are treated with regeneration methods can have similar effects on wildfire as does the thinning of a stand. After harvest, the regeneration units will have fuels reduction activities to dispose of the slash, either prescribed fire or machine piling.

Several studies suggest that a combination of methods (ie logging, piling, and underburning) be used for the best results. However, there is also research that suggests mechanical treatment or logging can have negative effects on fire behavior – essentially that flame lengths and rates of spread may actually increase from mechanical activities such as harvesting of the overstory in a forested stand. Research by Graham and others (1999) as well as Agee and Skinner (2005) support this – <u>if</u> the harvest operations leave slashed material in the stands <u>and</u> there is no follow up fuels treatment of the surface fuels. Because the proposed action *includes* post-harvest fuels reduction activities, surface fire would be the expected fire behavior (not crown fire), and fire intensities are expected to decrease where treatments have occurred.

In the short term (up to five years), logging slash created would increase the fire hazard until it was properly treated according to fuel mitigations listed above, or until it naturally abated. The unmerchantable branches and other fuels that are left after harvest can

substantially increase fuel load, increasing fire hazard until the fuel on site is treated with underburning or piling (USDA 2003, p 3). The increased hazard from slash is somewhat offset by stand density reduction. The removal of logs reduces fuels, and opening stands up would tend to force wildfires to burn on the ground and not in the tree crowns.

During harvesting operations, the potential of man-caused fire ignition increases. Common ignition sources include: equipment and vehicle operation, smoking, and arson. Standard timber sale contract provisions would require a timber purchaser to have fire suppression equipment on site and to take necessary fire precautions to prevent accidental wildfire ignitions. In the event of extreme fire conditions, harvest activities would be regulated or suspended until conditions improve. A timber sale administrator closely monitors the fire prevention requirements of the timber contract throughout the timber harvest operations.

The proposed action would increase the density of roads within the project area by approximately 2.2 miles. Although these roads would be put in storage after post harvest fuels treatments, they would be available for fire suppression activities, providing access for fire engines and other fire fighting equipment. Therefore, future suppression access would be improved in the area.

The proposed action alternative would remove part of the forest canopy, which would reduce the moderating effect of canopy (sheltering) on wind speed, so surface winds (winds beneath the canopy that effect surface fuels) would increase (Scott and Reinhardt 2001, pp. 31-32).

Agee has also stated that when activities are followed by sufficient treatment of surface fuels, the overall reduction of fire behavior and severity outweighs the increased winds and consequently the reduction in fuel moistures (Agee 2005, p4).

Lower flame lengths are indicators of reduced potential fire intensities, but cannot be used alone to determine the effectiveness of the proposed treatments. The spatial continuity and density of tree canopies in combination with wind and physical setting provide the conditions required for rapidly moving fires that typically consume the crowns (needles and small branches) of large forest areas (USDA 2004. p.15). Through thinning (reducing the canopy density) and other mixed treatments (breaking up of the canopy spatial continuity), causing a mosaic or patchiness, the spread of fire through a canopy will be reduced (Figure 3). Further treatments, both prescribed fire and mechanical, will reduce the surface fire intensities, thus further reducing potential sustained crown fire. As Canopy Base Height is raised and surface flame lengths are reduced the potential of fire moving into the canopy is lessened and the effectiveness of suppression efforts is increased.

Cumulative Effects

The cumulative effects analysis area, and the past, present and foreseeable future actions considered are described in the No Action Alternative cumulative effects section of this report.

Past timber harvest can affect fire activity, thus fire risk. The effects of past harvest on Forest Service-administered lands within the Gold Crown project area are varied, from the removal of selected individual trees to regeneration cuts. The effects on fire from

timber harvest are also variable, depending on the amount of canopy removed, the subsequent fuel treatment, and the time since harvest. Timber harvest without subsequent fuel treatment may have the same effect as fire suppression, by causing an increase in surface fuels. The Gold Hill timber sale harvested timber and applied prescribed fire to reduce the surface fuels in the harvest units. In combination with the past timber harvests, the proposed action would effectively reduce fire intensity potential in the project area and reduce crown fire sustainability.

In the report "Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects" it is stated that:

> *"A combination of new treatments and maintenance treatments arrayed across a landscape can effectively disrupt fire growth and change fire behavior at the landscape scale, even though some stands within the landscape have not been treated recently."*(USDA 2003).

Most often, **timber harvests on private lands** tend to be partial cuts that remove trees of the highest economic value (usually the largest) and typically removes large, fire-resistant seral species. Natural regeneration is relied on to fill most created openings. This tends to favor shade-tolerant species such as Douglas-fir and grand fir, over early-seral species such as ponderosa pine and western larch. With increased values for private timber, and historic harvest practices on private lands, historic vegetation patterns may never be reestablished on private lands near the project area.

Slash treatments on private lands are controlled by the Idaho Department of Lands. Currently, there are fuel reduction efforts focused on private lands, primarily around structures within the resource area . These efforts are part of the Bonner County Urban Interface Fire Mitigation Committee (BONFIRE), an interagency partnership that works collaboratively to reduce hazardous fuels in the urban interface across all ownerships. These activities would complement the Gold Crown proposed project by progressing towards a landscape approach of reducing fire intensities in the wildland urban interface.

Within the project area Stimson is also proposing overstory removal and seed-tree regeneration harvests on approximately 200 acres.

In the summer/fall of 2008 Idaho Department of Lands is expected to start a thinning and regeneration harvest project on approximately 105 acres.

Future timber stand improvement (TSI) thinnings will break crown to crown fuel continuity as it develops in regenerated stands. Wherever these treatments occur, slash would create a fuel hazard until it was disposed of or naturally abated. The long-term benefit would be dispersed thinned stands characterized by low fuel loads and relatively low hazard risk. This positive fuel situation could endure for decades until an understory develops under these young stands. These low risk stands would be scattered throughout the larger project area.

Hunter access and firewood gathering would not be changed by the proposed project or by the combination of past, proposed and future projects. However, with fuel hazards reduced in the project area and adjacent past project areas, the likelihood of damage from human-caused fires would be effectively reduced.

Summary

Fire intensities and flame lengths would be reduced by the proposed fuels reduction activities of Alternative B. Canopy densities would be reduced and fuel continuity would be disrupted. With reduced fire behavior, the effectiveness of suppression efforts would increase and risk of large, fast moving landscape fires and smaller, local fires would decrease within the project area. However, the fuel treatments within the project area alone would not reduce the risk of a wildfire initiating on adjoining lands. Fire suppression has been effective in the analysis area on adjoining lands, which has contributed to a substantial change in the vegetation and fuel loading. It is reasonable to assume that fire suppression will continue considering the close proximity to private property, resource values at risk, and continued private land development and human activity.

Cumulatively, the recent past management including road construction and ongoing private land hazard reduction efforts, would act with Alternative B to reduce fire risk and intensity in the project area vicinity. This would effectively reduce the risks to life, property, and natural resources in the Gold Hill area.

Compliance with the Forest Plan and Other Regulatory Direction

The proposed action alternative (Alternative B) is consistent with direction in the Forest Service Manual (FSM 5100.) The proposed action alternative (Alternative B) is designed to help accomplish the goals of the 10-Year Comprehensive Strategy (Strategy) by reducing hazardous forest fuels and restoring fire-adapted landscapes. One of the guiding principles of the Strategy is to set priorities that emphasize the protection of communities and other high-priority watersheds at-risk. The long-term emphasis is to maintain and restore fire prone ecosystems at a landscape scale. The Gold Crown Fuels Reduction Project is entirely within wildland urban interface as defined by the Bonner County WUI Fire Mitigation Working Group (BONFIRE plan.) The project area is in close proximity to homes, infrastructure, and areas of proposed and expected increasing development, as well as being entirely within the WUI. These factors make the Gold Crown Fuels Reduction Project a high priority for hazardous fuel reduction treatments. The No Action Alternative (Alternative A) does not address the objectives of fire management (FSM 5140), the goals of the Strategy, or the goals of the Bonner County WUI Fire Mitigation Plan.

The Forest Plan (p. II-38) identifies two standards regarding fire management.

<u>Standard #1</u>

Fire protection and use standards are specified by management area. Cost effective fire protection programs will be developed to implement management direction based on on-site characteristics that effect fire occurrence, fire effects, fire management costs and fire caused changes in values.

<u>Standard #2</u>

The Fire Management Action Plan will be guided by the following Forest-wide standards:

a) Management area standards

b) Human life and property will be protected.
c) Fire will be used to achieve management goals according to direction in management areas. Implementation guides will be prepared for prescribed fire projects and programs identified in Table 10 (IPNF Forest Plan, Appendix F) using unplanned ignitions.
d) Management area standards will be used in Escaped Fire Situation Analyses as a basis for establishing resource priorities and values.
e) The appropriate suppression response for designated old-growth stands in all management areas except in wilderness will result in preventing the loss of old growth. Fire policy in relation to old-growth within wilderness will be provided in specific management direction developed for each wilderness area.
f) 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.
g) Forest Fuel Management Fund expenditure priorities are:
    - Natural fuels that pose a threat to human life and property
    - Unfunded activity fuels
    - Areas where fuels/fire behavior is a threat to management area objectives.

Following is a description of how each alternative meets these Forest Plan standards. Forest Plan Standards 2d and 2e relate to wildfire suppression policy and requirements that are outside the scope of this project, and therefore compliance with these standards is not described. This project does not determine Forest Fuel Management expenditure priorities, so compliance with standard 2g is not addressed either.

No-Action Alternative (Alternative A)

The No-Action Alternative would not use prescribed fire to help meet the goals of the management areas within the project area. The alternative would not help develop cost-effective fire programs because it would allow far more intense potential fire behavior to exist in stands that, with treatment, would primarily exhibit low intensity, easily controlled fire behavior. Under the No-Action Alternative, severe fire effects, large wildfire management costs, and fire caused changes in values could reasonably be expected; these results could likely be prevented or lessened with action to treat forest fuels.

The No-Action Alternative would not take any preventative steps to protect human life and property within the project area from an uncontrolled wildfire. The continued succession of forest vegetation and fuels, mortality from insects and diseases, and the exclusion of fire would create areas where the trend in fire behavior characteristics would in time be inconsistent with the goals, objectives, and standards established in the Forest Plan. No activity fuels would be created under the No-Action Alternative, so there would be no need to treat activity fuels, which is consistent with the Forest Plan.

Proposed Action Alternative (Alternative B)

The proposed action alternative would use prescribed fire to help meet the goals of the management areas within the Resource Area, consistent with the Forest Plan. It would

help develop cost-effective fire programs by making substantial progress toward reducing potential intensities of wildfire in areas affected by past fire suppression. By inference, the more area treated to restore, maintain, and trend stands toward historical species composition, the better the alternative meets the Forest Plan goals. The proposed action alternative (Alternative B) would best meet the goals, objectives, and standards of the Forest Plan because it would reduce the severity of fire effects, the costs of potential wildfire, and fire-caused changes in values on most acres (573 acres.) Treatments under the proposed action alternative would begin to trend stands away from potential fire behavior that could threaten human life and property in and near the resource area. The activity fuels created would be treated in a manner that is consistent with the standards of the Forest Plan.

Air Quality

Regulatory Framework

Current direction to protect and improve air quality on National Forests is provided by:

- Clean Air Act amendments of 1977, 1990, 1999 (42 U.S.C. 7401-7626); the Clean Air Act (Section 110) requires each State to develop a State Implementation Plan (SIP) to identify how the State will attain and maintain national air quality standards. The EPA has established National Ambient Air Quality Standards (NAAQS) for smoke and other particulate matter. Idaho Department of Environmental Quality (DEQ) ensures compliance with the NAAQS through regulations and air quality permits which are contained in the Idaho State Implementation Plan (SIP). Conditions of the air quality permits ensure that emissions from permitted industrial sources would not cause or contribute to a violation of the NAAQS.

Page II-34 of the IPNF Forest Plan (Forest-wide standards) says:

- Participate with the State and others in the development and implementation of State Implementation Plans (SIP) that are compatible with management objectives for the IPNF
- All projects, contracts, and permits must comply with procedural and substantive requirements of the Clean Air Act, State Implementation Plans and State Smoke Management Plans
- Develop and use alternative slash (biomass) disposal methods that are practical and biologically sound
- Encourage utilization of forest products to reduce biomass, which must be disposed of otherwise

The Idaho Panhandle National Forests is a party to the North Idaho Smoke Management Memorandum of Agreement, whose intent is to minimize or prevent smoke impacts while using fire to accomplish land management objectives. The North Idaho group currently uses the services and procedures of the Montana/Idaho State Airshed Group (2006). A Missoula-based monitoring unit is responsible for coordinating prescribed burning in North Idaho during the months of March through November; they work in collaboration with the DEQ, assisting with any recommendations. During the winter

months (December through February), the Idaho Panhandle National Forests voluntarily collaborate with the Airshed Group. The Airshed Group monitors meteorological data, air quality data, and planned prescribed burning and decides daily on whether to issue recommendations on burning for the following day (Montana/Idaho Airshed Group 2006).

The Goals of the Montana/Idaho Airshed Group Smoke Management Program are:

- Minimize or prevent the accumulation of smoke in Montana and Idaho from Prescribed fire as necessary to meet state and federal ambient air quality standards.
- Provide for the use of prescribed burning as necessary for purposes such as hazard reduction, forest/rangeland regeneration, and wildlife habitat improvement.
- Report and coordinate burning operations on forests and rangelands in Montana and Idaho.
- Evaluate the Smoke Management Program annually.
- Ensure burning activities are conducted during periods of optimal smoke dispersion and air quality conditions as advised by the Monitoring Unit.
- Meet the requirements of EPA's Interim Policy.

Historically, prescribed burning has occurred in the spring and fall seasons, within 45 to 60 days during each season. Each year, a list of all prescribed burning (understory and pile burning) planned for the Sandpoint Ranger District is entered into a database administered by the monitoring unit before March 1. Before 11:00 a.m., proposed burns for the next day are entered into the database. By 3:00 p.m. the same day, the monitoring unit posts, on a website, any recommendations concerning the next day's burns.

Environmental Consequences

Direct and Indirect Effects

Alternative A (no action) would not have any direct effects on air quality because no burning would occur. However, without abating fuels in the project area, indirect effects could result if a wildfire were to occur. Smoke from a wildfire could impact air quality in northeastern Idaho and northwestern Montana, posing a health risk during the fire. However, it is impossible to predict the extent and duration of smoke produced from a wildfire. Smoke would likely quickly dissipate when the fire was controlled.

Alternative B (proposed action) would have a direct, short-term effect on air quality in the project area. Although the project area is located within an Impact Zone, coordination with the Montana/Idaho Airshed Group will be utilized to minimize the impacts caused from prescribed burning. Under this proposed action, approximately 198 acres would be piled and burned, and 261 acres would be underburned. The implementation of this proposal would mean that some fuel would be harvested and taken off site for the purposes of lumber, pulp, and miscellaneous firewood cutting. By taking this fuel off-site, it reduces the amount of emissions going into the atmosphere through prescribed burning.

It is expected that residents near the actual burn area might see or smell smoke; however, it is expected that most impacts will be in the form of "nuisance" smoke and/or smell but would meet all the ambient air quality standards established by the Environmental Protection Agency. During the evening hours following a prescribed burn, some smoke would be expected to settle into the lower draws and drainages surrounding the Gold Crown project area. Smoke trapped in these low lying areas would be expected to dissipate once morning temperatures rise and the nighttime inversions lift. To limit the potential effects of inversions, the Montana/Idaho State Airshed Group would only allow burns to be conducted when good or excellent dispersion conditions are indicated. Compliance with burning regulations established by the North Idaho Smoke Management Group would assure that standards are met.

Air quality impacts from the proposed project would result primarily from burning. Logging equipment would produce temporary emissions of engine exhaust and dust emissions from vehicle traffic on and off roads.

An indirect effect of this proposal is a reduction in the emissions that would be released from potential wildfires in the area. By removing the small-diameter surface fuels with controlled low-intensity prescribed fire, the potential of a high-intensity fire developing within the stands would be reduced.

Cumulative Effects

The cumulative effects analysis area for smoke, road dust, and other related effects is difficult to tie to a specific geographic area. The distance that smoke and dust will travel is dependent on numerous factors, including the prevailing winds, local winds, inversions, the amount of smoke generated from a burn, the amount of fuel to consume, the stability of the atmosphere, and others. However, since the project area is located in northern Idaho, only a short distance from Montana, it is reasonable to consider the cumulative effects area to be northeastern Idaho and northwestern Montana.

Past, present and reasonably foreseeable activities and their impacts on air quality are difficult to address in terms of cumulative effects. Several large fires have occurred near the project area over the past century, as referenced in the Gold Crown Area Fire History and Occurrence; however, those effects on air quality are gone and cannot be viewed cumulatively.

Cumulative foreseeable activities that produce pollutants include, but are not limited to, burning on private lands and public lands, use of fireplaces, dust from unsurfaced roads, wildfires, and so on. Because of the coordination of prescribed burning in North Idaho and the collaboration with the DEQ, overlapping effects to air quality are minimized.

No-Action Alternative (Alternative A)–If a large wildfire were to occur, the Forest Service and the DEQ would probably restrict all regulated burning. However, effects of smoke from a large wildfire could become cumulative with unregulated pollutants in the area, such as smoke from fireplaces, dust from roads, etc. These types of cumulative effects are difficult to measure and predict.

Proposed Action Alternative (Alternative B)- Smoke from prescribed burning is transitory in nature. The effects of the proposed action from smoke are not likely to have cumulative effects with other activities in the airshed given the oversight by the DEQ.

The district's burn-day determinations only allow burning when criteria are met that allow for good smoke dispersion. Daily regulation of amount of burning is managed to reduce impacts and negative effects of smoke. The number of days to accomplish prescribed burning in this project would compete with other burning in the airshed on any given day. It will be up to the Forest Service to establish burn priorities and the responsibility of the Air Quality Management District to manage those members of the Montana/Idaho Airshed Group that propose burning on that given day. If air quality is exceeding thresholds when proposed activities are scheduled to occur, Alternative B may result in some delays in burning as a result of this increased demand for "air space." Given these circumstances, there would likely be little to no cumulative effects from Alternative B.

Consistency with the Forest Plan and Other Regulatory Direction

Since Alternative A does not directly create any air quality impacts, it would be consistent with Forest Plan Standards and the Clean Air Act. If a large wildfire were to occur, air quality standards would likely be exceeded until the fire were controlled.

Burning in Alternative B would be performed in accordance with smoke management practices, which are designed to prevent the smoke from causing a violation of the NAAQS. As stated above, there is little risk that a violation of any ambient air quality standard would occur as a result of the proposed action. Alternative B would be consistent with Forest Plan Standards and the Clean Air Act.

Wildlife Resources

The wildlife specialist's report in the project file discusses in detail the effects of the proposed activities on wildlife species and habitat. The report discusses regulatory framework; analysis methodology; prefield and field survey results; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action; and consistency with regulatory direction.

Affected Environment

Species Not Analyzed in Detail

A preliminary analysis was conducted for each potentially affected wildlife species and their habitat to determine the scope of analysis. The species listed in Table III-6 would not likely be affected by the proposed activities because:

- they do not have suitable habitat,
- they are not expected to be in or near the project area,
- they would not be impacted, or
- impacts would be avoided or inconsequential given the project design.

For these reasons, these species were not analyzed in detail.

Table III-6. Wildlife species not analyzed in detail.

Species	Rationale for Elimination from Detailed Analysis	Preferred Habitat
Threatened and Endangered Species		
Woodland Caribou (*Rangifer tarandus caribou*)	No suitable habitat is present within the project area. The project area is outside recognized caribou habitat.	Above 4,000 ft. in Englemann spruce/subalpine fir and western red cedar/western hemlock forests.
Canada Lynx (*Lynx Canadensis*)	The project area is not within a designated Lynx Analysis Unit (LAU) and does not provide a corridor for linking lynx habitat.	Higher elevation lodgepole pine and spruce/ fir forests with adequate prey base of snowshoe hares, its primary food.
Grizzly Bear (*Ursus arctos horribilis*)	The project area is not within a designated Bear Management Unit (BMU) or an area supporting grizzly bears outside of the recovery area.	Habitat generalist with seasonal preferences. Denning areas isolated and remote from human development.
Sensitive Species		
Bald Eagle (*Haliaeetus leucocephalus*)	No known nests or winter roosts within the project area. Potential use of privately owned shoreline adjacent to the project area, but has limited value because it is highly developed.	Normally nest and forage near large bodies of water. Winter visitors or yearlong residents of northern Idaho.
Gray Wolf (*Canis lupus*)	No wolf packs or wolf activity documented within or near the project area.	Wide variety of habitats generally remote and isolated from human development. Adequate populations of prey species, including wintering concentrations of deer or elk.
Black Swift (*Cypseloides niger*)	No suitable habitat is present within the project area.	Builds nest behind or next to waterfalls and wet cliffs.
Harlequin Duck (*Histrionicus histrionicus*)	No suitable habitat is present within the project area.	Shallow, swift streams in forested areas.
Peregrine Falcon (*Falco peregrinus anatum*)	No suitable habitat is present within the project area.	Open habitats near cliffs and mountains. Nest in cliffs near an adequate prey base.
Common Loon (*Gavia immmer*)	No suitable habitat is present within the project area.	Large, clear lakes below 5,000 ft. elevation with at least a partially forested shoreline.
Fisher (*Martes pennanti*)	Project area does not contain the appropriate habitat characteristics to support fisher largely due to the lack of contiguous suitable habitat.	Mature, mesic forested habitats. Strong affinity of forested riparian habitats.
Northern Bog Lemming (*Synaptomys borealis*)	No suitable habitat is present within the project area.	Bogs, fens and, wet alpine and sub-alpine meadows.
Townsend's Big-eared Bat (*Plecotus townsendii*)	No suitable habitat is present within the project area.	Caves, mines, and abandoned buildings.
Wolverine (*Gulo gulo*)	No suitable habitat is present within the project area.	Far-ranging omnivorous, habitat generalist.
Coeur d'Alene Salamander (*Plethodon vandykei idahoensis*)	Potentially suitable habitat excluded from project activities by project design.	Springs, seeps, spray zones.

Species	Rationale for Elimination from Detailed Analysis	Preferred Habitat
Management Indicator Species and Others		
American Marten (*Martes americana*)	Project area does not contain the appropriate habitat characteristics to support fisher largely due to the lack of contiguous suitable habitat.	Variable mature conifer stands with canopy closures greater than 40 percent with abundant large, down woody debris
Forest Landbirds	Best addressed on a large scale and by ecosystem and habitat condition rather than on a species-by-species basis at the project level, particularly since any action, including no action, would be detrimental to some species and beneficial to others. The potential impacts on habitats utilized by forest landbirds are addressed in the analysis for other wildlife species that are analyzed in detail.	Diverse habitats, dependent on species.

Species Analyzed in Detail

Wildlife species analyzed in detail in the Wildlife Report (see project file) are those that have been identified as species of concern within the project area that could potentially be affected by proposed activities. The detailed analysis for each species describes the environmental baseline and relevant habitat components that may or may not be affected by the alternatives, if they were to be implemented. Information presented in the analysis is based on scientific literature, wildlife databases, and professional judgment, along with field surveys and habitat evaluations conducted over the last three years.

Table III-7 summarizes the species analyzed in detail, the rationale for analyzing them, and their preferred habitat.

Table III-7. Wildlife species analyzed in detail.

Species	Rationale for Detailed Analysis	Preferred Habitat
Sensitive Species		
Flammulated Owl (*Otus flammeolus*)	Suitable habitat is present within the project area.	Mature to old growth ponderosa pine, Douglas-fir forest.
Black-backed Woodpecker (*Picoides arcticus*)	Suitable habitat may be present within the project area.	Mature conifer stands with numerous snags. Post-fire habitat producing an abundance of snags.
Pygmy Nuthatch (*Sitta pygmaea*)	Suitable habitat is present within the project area. Due to similarities in habitat requirements and potential impacts, this species will be analyzed with flammulated owl.	Ponderosa pine habitat, especially mature to old growth stands.
Fringed Myotis (*Myotis thysanodes*)	Suitable habitat is present within the project area. Due to similarities in habitat requirements and potential impacts, this species will be analyzed with flammulated owl.	Caves, mines, and abandoned buildings, large snag habitat.
Boreal Toad (*Bufo boreas*)	Terrestrial and breeding habitat is present within the project area.	Adults occur in a variety of uplands. Breed in shallow ponds, lakes, or slow moving streams.

Species	Rationale for Detailed Analysis	Preferred Habitat
Management Indicator Species and Focal Species		
Northern Goshawk (*Accipiter gentilis*)	Suitable habitat is present within the project area.	Mature to old growth forest with a relatively closed canopy.
Pileated Woodpecker (*Dryocopus pileatus*)	Limited suitable habitat is present within the project area.	Forests with tall, large diameter dead or defective trees for nesting.
White-tailed Deer (*Odocoileus virginianus*)	Limited winter range within the project area would not be impacted in a way that would result in a meaningful or detectable change.	Mosaic of habitat types that provide open parks for foraging and forested areas for thermal and security cover.

Environmental Consequences

The resource information provided in the Wildlife Report (see project file), especially as it relates to wildlife habitat analysis, includes past actions such as timber harvest that have influenced vegetation changes to create what now is part of the existing or baseline condition. The effects analysis considered design features for wildlife that are described in Chapter II as well as applicable past, current and ongoing, and reasonably foreseeable actions. See Table III-8 below for a summary of the effects determinations.

Table III-8. Summary of wildlife effects determinations.

Species	Alternative A - No Action	Alternative B - Proposed Action
Threatened and Endangered Species		
Grizzly Bear	No effect	No effect
Woodland Caribou	No effect	No effect
Canada Lynx	No effect	No effect
Sensitive Species		
Bald Eagle	No impact	No impact
Gray Wolf	No impact	No impact
Flammulated Owl	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species
Black-backed Woodpecker	No impact	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species
Black Swift	No impact	No impact
Harlequin Duck	No impact	No impact
Peregrine Falcon	No impact	No impact
Pygmy Nuthatch	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species
Common Loon	No impact	No impact
Fisher	No impact	No impact
Wolverine	No impact	No impact

Species	Alternative A - No Action	Alternative B - Proposed Action
Northern Bog Lemming	No impact	No impact
Townsend's Big-eared Bat	No impact	No impact
Fringed Myotis	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species
Coeur d'Alene Salamander	No impact	No impact
Boreal Toad	No impact	May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species
Management Indicator Species and Others		
Northern Goshawk	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status
Pileated Woodpecker	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status
American Marten	No impact	No impact
White-tailed Deer	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status
Forest Landbirds	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status

Consistency with the Forest Plan and Other Regulatory Direction

Given the above effects analysis and determination, and in consideration of design features described in Appendix A, the project wildlife biologist determined that both alternatives are consistent with the Forest Plan direction to manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations, which could lead to federal listing under the Endangered Species Act (USDA Forest Service 1987). Therefore, these actions would also be consistent with the National Forest Management Act requirements to provide for the diversity of plant and animal communities across the Forest. However, Alternative A could result in a trend toward a decline in habitat quality over time.

Fisheries Resources

A detailed fisheries report (the joint Biological Assessment and Biological Evaluation for Fisheries Resources, as well as the no-action effects memo) is in the project file. The reports discusses in detail the regulatory framework; analysis methodology; field survey results; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action alternatives; and consistency with regulatory direction. The report disclosed potential effects to federally listed bull trout, fish species designated as sensitive by Region One. The following summarizes the information in the fisheries reports.

Affected Environment

Existing conditions with regard to fisheries resources were determined based on field surveys conducted in 2006 and 2007 by fisheries and hydrology personnel. See the fisheries report in the project file for a detailed discussion of the field survey methodology and results.

Fish Species in the Project Area

Three primary fish species may currently inhabit a few streams within the project area. Those species are westslope cutthroat trout, eastern brook trout *(Salvelinus fontinalis*) (an invasive non-native), longnose dace (*Rhinichthys cataractae*) and shorthead sculpin (*Cottus confusus*). Bull trout occur in Lake Pend Oreille, but do not inhabit any streams within the project area because Hays Gulch and Gold Gulch are not large enough to provide adequate spawning habitat or navigable passage for large migratory adults.

Fish community structure and habitat use of streams within the project area are controlled by physical barriers, steep gradients, flow regime, and size of habitat patches. Based upon comparison to similar size streams tributary to Lake Pend Oreille (Tumbledown Creek, North Twin Creek, Garfield Creek, Mirror Creek, Old Maid Creek, and Cape Horn Creek) and the history of fires and land use of the project area, the fish composition is likely dominated by westslope cutthroat trout and eastern brook trout, particularly in the headwater reaches (USDA Forest Service 2008).

Fish Habitat in the Project Area

Nine small streams within the project area drain the Gold Hill area (see Table III-9). These streams are relatively small (1st to 3rd order) and similar in geomorphic structure, and most drain into Lake Pend Oreille. Most of the streams are intermittent or seasonal in hydrography; however, five streams have perennial sections and two streams have perennial sections that most likely support fish. The two suitable fish-bearing streams are Gold Gulch and Hays Gulch (see the project area map on page 26). The middle reaches of these streams have flow permanence, gradients, and habitat patch sizes capable of supporting low-density resident cutthroat trout populations.

Other fish species (sculpin, dace, etc.), if present, are more likely to use stream sections closest to the lake. There are no known naturally-occurring physical barriers near the mouths of these streams that would preclude fish from colonizing Gold and Hays Gulch. Field observations near the mouths of Hays and Gold Gulch indicate these streams are

indeed large enough and have well-formed pools and channel materials capable of supporting fish (see field photos in the project file). Thus, the best available information indicates that Hays and Gold Gulch may be fish-bearing.

Table III-9. Descriptive information for streams within the Gold Crown project area.

Name	Flow Regime	Stream Order	Stream Gradient (%)	Catchment Area (acres)
Hays Gulch	Perennial	1st to 3rd	19.0	580
Gold Gulch	Perennial	1st to 3rd	13.0	1350
Tributary to Gold Gulch	Perennial	1st	31.0	50
Gold Gulch tributaries	Seasonal	1st to 2nd	> 20.0	256
West Fork Gold Gulch	Perennial	1st to 2nd	19.0	245
Section 6 stream	Perennial	1st to 2nd	21.0	637
West Contest Point stream	Seasonal	1st	27.0	54
East Contest Point stream	Seasonal	1st to 2nd	38.0	195
Section 30 stream	Perennial	1st to 2nd	27.7	284
Providence Lake Tributary	Seasonal	1st	1.0	313
Garfield Creek and tributaries	Perennial	1st to 3rd	5.0	3037
Section 31 NE stream	Intermittent	1st	23.8	212

In light of the ambiguity of thresholds for fish habitat suitability for North Idaho (see the fisheries report in the project file), a logistic regression model was used to determine fish-bearing end points in Hays and Gold Gulches. The model applies catchment area, gradient upstream of a point, gradient downstream of a point, elevation of a point on the stream, and precipitation to provide a probabilistic determination of fish presence/absence. The model also employs a “stopping rule” once the probability of fish falls below 40 percent (Needham 2005 adapted from Fransen et al. 2006).

The limitations of this model must be acknowledged and include the following:

- predicted “end of fish-bearing” points do not always accurately portray reality,
- high levels of error for model outputs are associated with the presence of unknown fish passage barriers, and
- moderate levels of error are associated with marginal habitat (lower quality), streams that originate from headwater lakes, and streams of low topographic relief.

Given the general trends from these models, the project fisheries biologist conservatively interpreted the results to depict the most upstream point of potential fish habitat as well as the INFS categorization of streams. While this information suffices for resource analysis, resource protection will be provided by verifying RHCAs in the field.

The Forest Road 2642 network overall is in good condition with few drainage and erosion problems. Grading and drainage maintenance are performed frequently on the main road; however, some spur roads are overgrown with brush and receive no maintenance. ATV use of these un-maintained roads appears to be exacerbating isolated areas of resource damage from road erosion.

Specifically, portions of FS road 2642C have poor drainage, and one stream crossing is receiving above-background levels of fine sediment. This sediment is being delivered

downstream (approximately 100 m) to portions of Gold Gulch. Current channel conditions in Gold Gulch do not appear to be outside of the natural range of variability for sediment input in the downstream fish-bearing reaches (see Project File Photographs). Hydrology surveys describe these streams as structurally controlled with straight and steep channel forms (Rosgen channel type A) that are capable of transporting suspended sediment downstream. Fish-bearing reaches closer to the lake are less steep, but are still confined (Rosgen channel type B) and capable of routing minor amounts of sediment without dramatically altering habitat features.

For additional information about water quality, channel conditions, and streamflow for project area streams please refer to the hydrology report in the project file.

Environmental Consequences

Effects analysis was based on the results of field surveys, peer-reviewed literature, design features described in Chapter II and professional judgment of the project fisheries biologist.

Alternative A - No Action

Direct and Indirect Effects

Under the no-action alternative (Alternative A), vegetation or fuels reduction treatments would not be performed, and roads would not be constructed or reconditioned. More intense and lasting road maintenance (culvert upgrades, repair of drainage problems, etc.) would not occur in the project area. Specifically, maintenance related to the 2642 C Rd where drainage problems were identified would not be performed as part of the no-action alternative (Alternative A.). As a result, the short-term negative impacts related to road maintenance work, followed by the long-term benefits derived from improving the drainage and reducing overall sediment delivery potential would not occur.

With the absence of fuel treatments, the no action alternative could have other effects. No action could indirectly result in a higher risk of a stand-replacing, high-intensity wildfire across the project area because fire suppression activities could be more difficult as a result of the more extreme fire behavior encountered in untreated areas (see Fire, Fuels and Air Quality Report in the project file). A high-severity fire is not certain to occur within the project area during a given timeframe; however, such an event could result in indirect “fire-related” effects to fisheries resources. It is not possible to predict when and where fires will occur. To a greater extent, we know much less about fire effects in riparian areas and forecasting with any degree of certainty the exact effects of fires in riparian areas is speculative at best. Rather, we can describe, in general terms, fire risks and effects to riparian areas and fisheries resources.

In the project area, high intensity fires occurred in the not too distant past. Many of these small streams, including Gold and Hays Gulch, experienced severe wildfires in the 1920s and 1930s (see figure 1 in the fisheries no action analysis report, project file). Very little riparian forest remained intact during those events except for some patches in middle reaches and at the mouth of Gold Gulch as well as the southern slope (north-facing aspect) of Hays Gulch. Most of the small drainages were completely denuded of vegetation. Changes in channel morphology, sediment regime, and thermal conditions

undoubtedly ensued. Yet, within 80 years these streams and fish communities have recovered from this disturbance.

Another high-intensity wildfire would have potential for impacts to fisheries resources in severely-burned watersheds. The hydrology and soils reports (see project file) concluded that a severe fire event could increase the potential for soil erosion and sediment delivery to streams. This, in turn, could pose short-term negative effects to stream habitats and fish species currently inhabiting streams. Observational studies have detected higher water temperatures, increased nutrients in water, shifts in aquatic insect communities (Minshall, decrease in gravel size, greater embeddedness due to upslope erosion, less large wood and habitat in burned streams (at least 40 percent burned catchment) than observed in nearby unburned streams (Minshall *et al*. 1997). Post-fire erosion has been linked to acute punctuations of sediment, from fines to boulders, and woody debris materials (Benda *et al*. 2003). Further, this pattern of sediment/debris inputs following fires likely produce new habitats and the patchy distribution of habitats. These short-term post-burn habitat effects can be severe enough to cause direct mortality (Minshall and Brock 1991) and local extirpation of fish populations (Howell 2006, Rinne 1996).

Fish populations in small streams can be quite vulnerable to extirpation by severe fires because they are primarily resident fish and are isolated from founding populations by barriers. Such is the case for Hays and Gold Gulch owing to the impassable culverts under Bottle Bay Road. Recovery of these fish populations would depend upon surviving individuals above these culverts. As a matter of scale and magnitude, it should be clarified that fire-induced or harvest-induced sediment yield still is considered only a fraction of the inputs of fine sediment from extensive forest road construction and forest road networks (Rieman and Clayton 1997). The road network of the Gold Crown Project Area is not considered extensive, but does contribute and has contributed greater amounts fine sediment to streams than would a fire over the course of decades that the roads have occurred.

Over the long-term, the understood impacts of fires and severe fires on fisheries can be beneficial when well connected, complex habitat network exists (Rieman and Clayton 1997). The same disturbance processes of mass sediment and wood delivery into streams that can cause those short-term negative impacts, in fact serve as processes for renewal of habitats and an influx of nutrients (Gresswell 1999). Others studies have recorded dramatic improvements in fish habitat quality and diversity as well as use of habitats by trout within 5 – 10 years post-fire (Burton 2005). As for riparian areas, our current understanding of fire risks, riparian processes related to fire, and fire behavior in riparian areas is poor.

Determination of Effects on Bull Trout

Although bull trout are regular inhabitants of Lake Pend Oreille, there are no streams or waterbodies within close enough proximity to this project's activities to affect this species or any of the habitats on which it depends. Because bull trout do not use any of the streams within the project area, the closest Designated Critical Habitat for bull trout is Lake Pend Oreille and there are no direct or indirect effects from no-action alternative that could affect bull trout within the lake. Therefore, this alternative would result in ***No Effect*** to bull trout.

Determination of Effects to Sensitive Species

Westslope cutthroat trout likely occupy portions of Gold Gulch and Hays Gulch (see Fisheries Analysis Map). The habitats in these first and second order streams are typical of steep headwaters and contain woody debris jams and step – pool habitat formations.

In the event of a severe and catastrophic wildfire, the short-term negative effects to aquatic habitat described above have the potential to negatively impact westslope cutthroat trout in Hays and Gold Gulch. Fires could cause inputs of sediments across a range of sizes and increases in temperatures, which would affect westslope cutthroat trout through gill irritation, displacement, temporarily altered feeding habits, even death and potential local extirpation. These effects would occur for a short duration (1-5 years) and likely would not affect the entire stream length because fires in riparian zones burn with mixed severity and produce patches of burned and unburned riparian forest stands.

We have no models to predict the spatial extent and/or timing of fire events; however, the fuel models of riparian forest stands along fish-bearing portions suggest that they would respond in a manner consistent with patchy burns and mixed severity. This suggests that there would be patches of refuge habitat where cutthroat trout could survive and ultimately recolonize degraded stream reaches. Our current understanding of riparian fire ecology, and the fact that this species has evolved with fire as a natural and renewing disturbance mechanism, means that the anticipated mixed-severity riparian wildfire would occur within known ecological limitations of this species. Therefore, the No Action alternative would have ***No Impact*** to westslope cutthroat trout.

Cumulative Effects

The cumulative effects area for fisheries is the same as the project area boundary and encompasses approximately 8,601 acres. The Gold Crown Fuels Project occurs within a specific area of the Lake Pend Oreille Riparian Composite 5th level watershed (5th Level HUC No. 1701021401).

A complete description of relevant past, present, and foreseeable actions related to the cumulative effects to fisheries resources can be found in the cumulative effects analysis of the Action Alternative (Alt. 2). Due to the fact that the described fire-related effects and perceived effects of not pursuing any activities of the projects would not have any predictable, measurable effects, there are no effects that would contribute to a cumulative impact on fisheries resources.

In terms of heightened fire risks, future wildfire suppression and natural forest ecological processes will likely produce additional accumulations of down, woody debris (or fuels) and a higher fire hazard prior to the next stand-replacing fire event. If high severity fire does not burn the project area in the future or only burns a very small portion, the cumulative effect of no action would likely be a continuation of the status quo. Existing fish populations would likely continue on the same current state. If high severity fire burns an extensive portion of the Hays or Gold Gulch in the future, the existing chronic sediment inputs from the road network could overlap with a large pulse (i.e. one time shot) of sediment that follows severe fire. This overlap in disturbance regimes could exacerbate and prolong the negative effects of post-fire sedimentation for at least five years. Research indicates that the short-term pulse of sediment created by fire is clearly

more favorable and tolerable for the fishery than the constant sediment inputs produced by roads (Rieman and Clayton, 1997). However, the combination of the two disturbance regimes could prolong the recovery of probable westslope cutthroat trout populations in Hays and Gold Gulch to pre-fire conditions.

Alternative B - Proposed Action

Direct/Indirect Effects

Proposed activities under this alternative are largely separated from the aquatic environment, as most units occur on ridges or the upper portions of slopes. In addition, all of the project's ground-disturbing activities are located on landtypes with either low or moderate sensitivities (USDA Forest Service 2008 [landtype database], Soils Analysis), which reduces the overall risk/potential for sediment yield and delivery to streams. Through an individual unit analysis, RHCAs have been classified into appropriate categories to provide protection to those waterbodies and to maintain current riparian conditions adjacent to those waterbodies. By protecting riparian areas, the channel processes that form and maintain quality aquatic habitat along the entire length of these small streams would be retained. Important habitat developmental processes occur in headwater regions and, although the exact linkages are poorly understood to date, they are vital determinants of the productivity and stability of aquatic habitats downstream (Gomi et al 2002).

That said, it is critical that adequate riparian and streamside protection be provided to these streams by correctly and even conservatively designating RHCA status (see Mandatory Conservation Measures). By adhering to this principle, this project would not directly affect temperature, sediment regime, habitat cover/complexity, pool frequency, or width/depth ratios because there are no fuel treatment units or yarding scheduled to occur within/across any RHCA.

Road construction, reconstruction, and maintenance activities do, however, have the potential to indirectly affect Riparian Management Objectives (RMOs) and sediment inputs into stream channels. Road networks and road construction, in general, have the capacity to disrupt natural stream processes relevant to fish through three primary mechanisms: altered sediment regime, altered hydrology (discussed later), and habitat fragmentation (Gucinski et al. 2000).

Construction of new roads, road reconstruction, and road maintenance would occur within riparian zones of several headwater streams. This work would be performed so as to avoid delivery of sediment to live streams and minimize vegetative and soil damage in RHCAs. Two new permanent roads would cross two separate seasonal/perennial streams with hardened ford crossings. The hardened fords would be constructed after streams have run dry for the season and when riparian soil disturbance and sediment delivery would have the least impact.

Road work, including new road construction and road improvements, may indirectly affect native cutthroat trout by temporarily increasing sediment delivery into the stream networks of Gold Gulch. The effect of sediment delivery would be short-lived (1-2 years) and would only impact short (<50 m in Gold Gulch) habitat segments in the upper most fish-bearing portions of Gold Gulch. Over the mid-term (1-10 years), the

improvements made to the existing road network for this project should reduce the amount of road-derived fine sediment delivered to Gold Gulch, Hays Gulch, and Garfield Creek and the several other unnamed streams, particularly when roads are used by commercial vehicles (Reid and Dunne 1984, Bilby et al. 1989). There are no road-stream crossings on FS roads that currently impede fish passage, and no road-stream crossings are proposed that would fragment fish habitat.

Sediment delivered to the stream channels as a result of road work may reach the fish-bearing portions of the Gold Gulch, but the quantities would be low. The sediment-related effects to fish as described below would affect short-sections of habitat (<50 m) and would only persist for one to two years. Effects to fish could potentially result from elevated turbidity (>25 NTUs; Waters 1995), which could temporarily displace or cause physiological stress to individual fish within the immediate vicinity (100 m downstream). Additionally, the deposition of sediments into the streambed of fish-bearing reaches of Gold Gulch could reduce the productivity of individual habitat units due to losses in macroinvertebrate production. However, effects will be insulated by the distances between ground disturbing activities and potential fish-bearing stream reaches (the closest is greater than 1000 feet). The construction of hardened fords for new road construction has the greatest potential to deliver sediment to Gold Gulch.

Other road reconstruction, maintenance activity, and road use on perennial stream crossings have potential to deliver small quantities of sediment to downstream reaches occupied by fish. Mitigation measures (see Chapter II - Features Designed to Protect Fisheries) and best management practices (USDA Forest Service 1988; FSH 2509.22) would limit the increased risk in sediment production/delivery to low levels. In addition, the anticipated impacts to sediment yield as a result of implementing the proposed action do not indicate measurable impacts to the headwater streams.

The proposed timber removal treatments and road construction would create additional canopy openings within some of the drainages that could potentially increase water yield and impact streamflows; however, the proportional change in acreage of canopy opening as a result of the project would not be expected to cause measurable changes in peak flows for streams within the project area (see the hydrology report in the project file).

Determination of Effects to Threatened and Endangered Species

The US Fish and Wildlife Service lists bull trout as threatened for the IPNF (USDI 2008). Although bull trout are regular inhabitants of Lake Pend Oreille, there are no streams or waterbodies within close enough proximity to this project's activities to affect this species or any of the habitats on which it depends. Because bull trout do not use any of the streams within the project area, the closest Designated Critical Habitat for bull trout is Lake Pend Oreille; there are no direct or indirect effects, and thus no cumulative effects, from this project that could affect bull trout within the lake. Therefore, this project would result in ***No Effect*** to bull trout.

Determination of Effects to Sensitive Species

Westslope cutthroat is designated as sensitive by Region 1 of the Forest Service. This species likely occupies portions of Gold Gulch and Hays Gulch (see Fisheries Analysis Map). The habitats in these first and second order streams are typical of steep headwaters

and contain woody debris jams and step – pool habitat formations. Project activities are more concentrated in the Gold Gulch watershed than in Hays Gulch. In Gold Gulch, road building and reconstruction would occur, and several units abut the streamcourse RHCAs. A conservative approach has been applied to classify the Riparian Habitat Conservation Areas (RHCAs) into fish bearing (Category I) and perennial non-fish bearing (Category II) streams. In addition, these classifications, including Category IV streams would be verified by a biologist during layout.

Most project activities, such as the majority of fuel treatments would not affect individual fish or the populations to which they belong; however, road construction, reconditioning, and maintenance pose varied risks of affecting fish and degrading fish habitat, by increasing sediment loads in project area streams in the short-term. These effects would occur for a short duration (1-2 years) and would only affect short segments (<50 m) of habitat in the upper fish-bearing portions of Gold Gulch.

Sediment-related impacts to streams could affect westslope cutthroat trout through gill irritation, displacement, temporarily altered feeding habits, and even death (Bash et al. 2001, Meehan et al. 1991). Sediment contributed from road building and maintenance activities would be low based on site-specific timing restrictions (i.e., not between spawning and emergence) and would not occur when embryos or fry were most susceptible to entrapment or oxygen deprivation. Sedimentation could displace individual fish and could reduce the productivity of individual habitat units due to losses in macroinvertebrate production. The risk of long term impacts of degraded habitat as a result of sediment transport downstream into fish-inhabited streams is very low given the predicted volume of sediment.

Based upon the low likelihood and anticipated short duration of negative effects, the effects of this project are not great enough to threaten the persistence of the westslope cutthroat trout population in Gold Gulch, Hays Gulch, or Garfield Creek. Therefore, the project fisheries biologist determined that this project ***May Impact Individuals, But would Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species***.

Cumulative Effects

Management Indicator Species

This section addresses how this project contributes cumulatively to the past, ongoing, and reasonably foreseeable activities' effects to MIS and fisheries resources as defined by the National Environmental Policy Act of 1970. The cumulative effects area for fisheries is the same as the project area boundary and encompasses approximately 8,601 acres. The Gold Crown Fuels Project occurs within a specific area of the Lake Pend Oreille Riparian Composite 5th level watershed (5th Level HUC No. 1701021401). Less than seven percent of the project area is actually proposed for treatment on National Forest System Lands. This project has a low likelihood of contributing site-specific, measurable effects (via sediment related impacts) to fisheries resources. No other timber sales on Forest Service System Lands are proposed in the immediate vicinity of the project area at this time.

Other actions that have affected fisheries resources in the past include two catastrophic, landscape-scale wildfires that burned over 70 percent of Hays Gulch and 90 percent of Gold Gulch in the 1920s (see Historic Landscape Photographs in Project File). Large fires alone are not unusual in the intermountain west and should be consider as a critical structuring mechanism for aquatic habitats and fauna (Gresswell 1999). Salvage logging of remnant stands and riparian areas occurred in Gold Gulch and Hays Gulch areas following fires. Logging was not widespread and likely was done by homesteaders. Encroachments on riparian areas of these streams have persisted into this century as private lands have been developed along the lakefront.

Forest road 2642 was originally constructed in the 1960s, and the road network was expanded in 1995 with the Gold Hill Timber Sale. Road systems on private lands originated at various times; records as to original construction times are not available. The initial pulses of sediment from construction of hillslope roads (i.e., traversing FS land) have now faded; however, road prisms do yield more fine sediment than forested land each year. Road conditions, maintenance, and landtypes dictate the level of impact the additional yield has upon the streams those roads cross. The existing road network currently has little impact on the streams (see the hydrology report in the project file). Although road maintenance does put sediment in streams, it is performed periodically and is designed to minimize long-term erosion of forest roads. The legacy effects of those projects have already been incorporated into the analysis of this project by the establishment of a current environmental baseline. The actions tied to this project have low-risk effects, and, there are no effects that would contribute to a cumulative effect over the long-term. Therefore, the small short-term effect of sediment delivery would not add to a cumulative effect of total sediment delivered.

Ongoing and reasonably foreseeable activities in the vicinity of the sale area include the following:

- routine road maintenance (every 2-4 years),
- noxious weed treatment, recreation access to Gold Hill Trail,
- public firewood collection,
- fire suppression, and
- development on private land

Routine road maintenance will maintain proper road drainage over time and minimize sediment delivery to streams by addressing point sources of chronic sediment delivery to streams; however, sediment inputs to streams will persist. Noxious weed activities would follow guidelines established by the Sandpoint Noxious Weeds Control Project EIS (USDA Forest Service 1998).

Consistency with the Forest Plan and Other Regulatory Direction

The project fisheries biologist determined that, given the above determination of effects, and in consideration of design features described in Chapter II, implementation of the proposed action is consistent with the IPNF Forest Plan (USDA Forest Service 1987) as amended by the Inland Native Fish Strategy (INFS) (USDA Forest Service 1995) and subsequent changes (USDA Forest Service 2005). The project's consistency with INFS standards and RMOs are addressed in the Determination of Effects and Rationale section

of the joint Biological Assessment and Biological Evaluation for Fisheries Resources (see the project file). The No Action alternative would also comply with all regulatory direction related to fisheries resources.

Water Resources, Wetlands, & Floodplains

A detailed hydrology report is in the project file. The report discusses in detail the regulatory framework; analysis methodology; field survey results; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action; and consistency with regulatory direction. The following summarizes the information in that report.

Analysis Methodology

Water resource and road conditions were determined using aerial photography, GIS data, water quality information from the Idaho Department of Environmental Quality- Water Quality Division, and field reconnaissance by both hydrology technicians and a Forest Service Enterprise hydrologist. Landtype descriptions and hazard ratings were gathered from landtype descriptions and characteristics described in the Idaho Panhandle National Forests Land Systems Inventory (see project file). Field reconnaissance surveys of the project area were conducted during field seasons (summer) in 2007.

The Watershed Erosion Prediction Project (WEPP) model was used for further analysis with hillslope and road runoff and erosion predictions (Elliot 1999a, Elliot 1999b). WEPP was used for this analysis to estimate changes in runoff and maximum sediment delivery distances. The WEPP results were rounded up to provide for a conservative estimate of potential runoff and sedimentation impacts from thinning and roading activities. Estimates of erosion and sedimentation are not considered absolute values, but rather are estimates only for the purpose of comparing alternatives.

Actual erosion and sediment delivery rates would be expected to be lower than the WEPP model ouput figures reflect. This is because the WEPP model does not account for the mitigation measures to control erosion and sedimentation that the Forest Service would implement. Forest Service soil and water conservation practices have been found to greatly reduce impacts to water quality and soil resources (Seyedbagheri 1996). In particular, the model does not account for the improvements in road and trail drainage and design features to reduce erosion and sedimentation from the transportation system.

Information on streamflow and activities on private land was not available. Therefore, impacts to runoff and potential for rain-on-snow events are derived from runoff estimates from the WEPP model and qualitative analysis. Additional cumulative impacts from private lands were interpreted from aerial photography.

Affected Environment

The project area is located on gentle to moderately steep (5 – 50 percent) face drainages that overlook Lake Pend Oreille. Elevations range from approximately 2080 feet at the lakeshore to 4042 feet the summit of Gold Hill. The project is entirely located above Lake Pend Oreille (Hydrologic Unit Code 17010214). Three subwatersheds (delineated

by the IPNF) are overlain by the project boundary: Lake Face (850 acres) Garfield Creek (3119 acres) and Gold Creek Gulch (4632 acres). Gold Gulch subwatershed encompasses most of the project activities. No treatments are planned for the Lake Face subwatershed.

Precipitation (approximately 33 inches annually) is dominated by winter snowfall. Streamflow is generally derived from shallow groundwater sources. Overland flow is uncommon due to the abundance of vegetation, duff and litter layers.

All of the streams within the project area are mapped as intermittent or ephemeral streams. Field surveys were conducted in late summer during a relatively dry year for the project area. There are three named streams within the project area: Hays Gulch, Gold Gulch, and Garfield Creek. All channels were dry except for several seeps contributing to some limited stream flow. However, several streams, including Gold Gulch, Hays Gulch, and Garfield Creek, have stream channel characteristics that indicate that they are perennial streams; even though they are mapped as intermittent (stream mapping is usually done using 1:24000 scale maps and aerial photos, so errors in channel regime mapping are not uncommon). For the purpose of this analysis and project implementation, the mapping of stream channel regime was updated to include stream channel regime information gathered from field and computer modeling (see figure 2 in the hydrology report, located in the project file).

A total of 17.4 stream miles are in the project area (10.7 perennial and 6.7 intermittent). Most of the streams are steep, appear to be bedrock controlled and often follow faulting or jointing within the local geologic structure. Stream substrates tend to be large boulder, cobble sized material with interstitial sands. These larger substrates armor the channel banks and maintain stream channel stability- except as noted below. Several of the streams have permanent seeps at their source that produce discontinuous flow downstream.

All stream segments that were visited during field reviews in September of 2007 appear to be relatively stable. Stream shade and instream large woody debris appeared to be abundant at all sites. There was some stream channel instability noted in the intermittent tributary headwaters of Gold Gulch in SW ¼ of NW ¼ of Section 5. This instability is natural for the steepness of the subwatershed and the local fine depositional soils in the headwater basin of Gold Gulch. There was no evidence of past management activities in the area, and no uphill disturbances were found that would account for the gullying (less than two feet) in these tributary streams.

Providence Lake (approximately 17 acres) and four other small lakes (less than one acre each) are also located within the project boundary. There are several sinks or ephemeral ponds that exist as a result of the bench shape topography in the area. Most of these ponds appear to dry up annually, but they appear to maintain sufficient moisture subsurface to pose problems for heavy equipment.

All streams within the project area flow into Lake Pend Oreille. No streams in the project area are identified by the State of Idaho as not supporting Beneficial Uses. Therefore, none of the streams in the project area are listed as water quality impaired on the State's 303(d) list. Lake Pend Oreille, however, was placed on Idaho's 1994 Section 303(d) list as a "threatened" water body and retained on the 1996 and 1998 lists. The

State of Idaho has identified Lake Pend Oreille (ID17010214PN018L_0L) as not supporting Beneficial Uses due to elevated nutrients in near-shore areas. The pollutant of concern is phosphorus, which increases the growth of algae in the lake. A Total Maximum Daily Load (TMDL) was written in 2000 and subsequently approved by the Environmental Protection Agency (EPA). The main sources of the phosphorous are believed to be near-shore septic systems and runoff from developed areas with fertilized lawns. Phosphorus transported in the sediment of eroded soils associated with silvicultural activities is also a concern, but it is not noted as a major constituent in the current phosphorus loading in the lake.

The project area has experienced a variety of land uses in addition to the roading activities. Past and current uses include silvicultural vegetation management on both public and private lands, residential development, agricultural land use, and mining. Residential development is still on the rise as roads are being built and land is being cleared near-shore for future construction. The major impacts to water quality and water yield have come from these near shore residential development activities, as there is little buffering capacity between the development activities and the shoreline to trap and store sediment.

Past and current activities further upslope include mining, silvicultural vegetation management, and roading activities. These past and current land uses do not appear to be contributing measurable water quality problems. Furthermore, there is reduced opportunity for these activities (with the exception of roads) to impact water quality because they lack proximity to existing stream channels.

There are approximately 62 miles of roads in the project area. This includes a mixture of paved State and County roads; paved, graveled, and native surface private roads; and native surface FS Forest Development Roads. There are also approximately 4.7 miles of hiking trails. The Forest Service roads that would be mainly used for the project activities are the FS 2462 system and its spur roads. These roads are generally in good condition. There were no major areas of road surface rilling or gullying. There are 9 intermittent or ephemeral stream crossings along FS road 2462 that act as drainage relief for seeps and intermittent stream channels, but none of them were identified as undersized or plugged with debris during field visits. Some road drainage concerns were identified on Forest Road 2642C, but these can be ameliorated with road maintenance activities. All other stream crossings were on paved county maintained roads with little or no indications of sediment delivery.

Sediment modeling using the Water Erosion Prediction Project model (WEPP) indicates that sediment delivery averages 0.07 tons/year at each native road surface stream crossing site (based on model runs using 30 years of climate data). The minimum delivery rate estimate was less than $1/10^{th}$ ton/year and maximum delivery rates were 0.13 tons/year.

Environmental Consequences

Alternative A- No Action

Direct and Indirect Effects- No Action (Alternative A)

The no-action alternative (Alternative A) would result in no vegetation or fuels reduction treatments being performed, no new road construction or reconditioning, and no unscheduled maintenance of existing roads in the project area. Therefore, there would be no direct effects to water quality, stream channels, or changes to water yield as a result of the no-action alternative.

The no action alternative could indirectly result in a higher risk of a stand-replacing, high-intensity wildfire (see Fire, Fuels and Air Quality report in the project file.) A high-severity fire is not certain to occur within the project area during a given timeframe. However, the occurrence of a high-intensity wildfire would have an increased potential for impacts to hydrologic systems in severely-burned watersheds. The Soils report (see project file) concluded that such a fire event could increase the potential for soil erosion and sediment delivery to streams. This is caused by the loss of forest interception of rain and snowfall and the reduction of ground cover at the soil surface, which provides for a watershed with flashy runoff characteristics. This, in turn, could pose detrimental effects to water quality. Other potential detrimental effects to hydrologic systems in the project area could include the destabilization of stream channels due to excessive sediment loading, increased peak flows and overall increases in average annual water yield resulting from the loss of upslope evapotranspiration.

By contrast, the proposed vegetation and fuel treatments would reduce the chance that a wildfire could have as severe of an effect on the hydrologic resources and surrounding private property in treated areas as it could in untreated areas because there would be a reduction in the tons per acre of dead and dying fuels on treated sites (see Fire, Fuels and Air Quality report).

Furthermore, unscheduled road maintenance items (specifically that related to the 2642 C Road where some drainage problems were identified) would not be performed as part of the no-action alternative (Alternative A.) Rather, they would not be accomplished until the next scheduled road maintenance occurs in the area. As a result, the short-term negative impacts related to road maintenance work, followed by the long-term benefits derived from improving the drainage and reducing overall sediment delivery potential would be delayed or would not occur.

Cumulative Effects- No Action (Alternative A)

We can assume that within this project area, which is entirely within the wildland-urban interface, a foreseeable, future action will be wildfire suppression. Land management agencies and those with firefighting responsibilities in the area will have to continue to fight wildfires in the area to protect homes, private property, and public infrastructure. Additionally, natural ecological processes, including forest stand succession and tree mortality will also continue to occur. When the indirect effects of the no-action alternative are added cumulatively to the future wildfire suppression and natural forest ecological processes, we can predict there will be additional accumulations of down,

woody debris (or fuels) and a higher fire hazard prior to the next stand-replacing fire event. In this case, the potential detrimental indirect effects to hydrologic systems and resources (listed above) may be increased. These potential cumulative effects could include an increase in the destabilization of stream channels due to excessive sediment loading and increased peak flows, and overall increases in average annual water yield resulting from the loss of upslope evapotranspiration.

Alternative B - Proposed Action

Direct and Indirect Effects- Proposed Action

The primary concern for water resources on this project is to ensure that there are no further additions of nutrients to Pend Oreille Lake from the proposed treatments. The potential addition of nutrients could come from sediment derived from logging and slash treatments on vegetation management units, or from road construction or road maintenance activities.

The project would require a minimum of 60 feet of intermittent stream RHCA buffers on all vegetation treatment activity areas- wider for perennial non-fish bearing and perennial fish bearing streams. There would be no mechanical entry into these stream buffer zones. Incidental hand thinning or prescribed fire fuels treatment might occur, but direct ignition of fuels would not occur within RHCA zones. The project would follow R1/R4 Soil and Water Conservation Practices (Best Management Practices - BMPs) (USDA 1988).

Direct or indirect effects to water quality, stream channels, lakes, or wetlands are not likely to occur from implementation of the proposed action. All streams adjacent to proposed treatment units would be protected by Riparian Habitat Conservation Area (RHCA) stream buffers. Treatments are not scheduled to occur within RHCAs. The proposed activities would not be expected to influence streams within the project area. WEPP modeling indicates that sediment delivery from the proposed treatment units would not traverse through the 60 feet of intermittent RHCA stream buffers (150 feet for perennial non-fishbearing streams and 300 for perennial fish bearing streams) to a stream channel. Therefore, the likelihood of sediment impacting water quality from treatment unit activities is very low. Furthermore, sediment from treatment unit activities would not be expected to affect downstream water quality in Pend Oreille Lake due to the low potential for sediment delivery through the RHCAs.

Any potential for sediment derived from project activities would come from road construction and use and would most likely come from use of FS Rd 2462 or its spurs. None of the proposed new road construction or temporary road construction crosses a perennial channel. There are two proposed crossings on ephemeral channels; both of these would be hardened with coarse roadbed material to prevent erosion and sediment delivery. WEPP modeling indicates that sedimentation at these two sites would be approximately less than 1/10th ton at each site the first year of construction and less in following years. However, to ensure that sediment is not delivered downstream any measurable distance, it is *recommended* that slash filter windrows be constructed for 100 feet on either side of the crossing on the downhill side of all new and temporary road construction which cross intermittent channel or swale areas that connect to downstream intermittent channels. There are some crossings of swale areas, but these locations are

not considered stream channels and would not conduct sediment significant distances downslope. Furthermore, all existing stream channel crossings on FS RD 2462 that are tributary to Gold Gulch are *recommended* to be graveled to prevent any potential for sediment delivery from road maintenance activities.

WEPP modeling indicates that sediment delivery from road maintenance and use activities on those roads would be negligible. In all modeled scenarios, sediment delivery is currently 0.13 tons or less annually for each of the intermittent stream crossings on these roads. The addition of the proposed road construction and maintenance work would add soil disturbance and traffic; however, a substantial increase in sediment delivery is not expected to occur. WEPP modeling shows an increase from road use and maintenance activities to approximately 0.27 tons/yr for one to two years, while project activities are occurring. Afterwards, sediment delivery would drop back to the current condition.

These predicted amounts are well within the variation of natural sediment inputs and could not be differentiated from natural or project caused sedimentation. Stream channel stability would not be affected locally, as downstream channels tend to be well armored with boulder and cobble material. Sedimentation downstream would also be minimized. Most of the intermittent stream channel crossings are tributary to Gold Gulch. Sediment transport distances would need to exceed 1.5 miles to affect downstream lake resources. However, the volumes of predicted sediment delivery from the project are far too small to have any measurable consequences over that distance. The combination of in-channel sediment storage and the variation in natural background sediment transport would make measuring or discerning project-related sedimentation at the lake improbable.

Implementation of Soil and Water Conservation Practices (SWCPs) (also known as Best Management Practices or BMPs) would prevent the delivery of the any sediment generated from road activities. Several studies have found BMPs and site specific project design features to be effective in controlling impacts from forest management activities to water quality and stream habitats (Megahan et al. 1992, Seyedbagheri 1996). The specific BMPs, which apply to this project, are SWCP 15.21 - Maintenance of Roads, 15.23 - Traffic Control During Wet Periods, and 15.25 - Obliteration of Temporary Roads (USDA 1988).

Timber harvest that removes a large portion of the forest canopy may lead to increased peak flows because the trees are not present to intercept rain or snow, and fewer trees are using water from the soils in a process called transpiration. Opening the canopy of a forest can result in higher peak flows, occurring earlier in the season; whereas, base flows are sometimes reduced. Therefore there is the potential that total water yield could be increased (Benoit 1974).

The subwatershed that is receiving the most treatments is Gold Gulch (532 acres). The Gold Gulch subwatershed itself is a series of approximately three or four smaller face subwatersheds. The small subwatershed encompassing Gold Gulch is the primary channel of concern for fisheries issues, as it has the highest likelihood of supporting fish populations. There are approximately 240 acres of proposed treatments within this smaller subwatershed (approximately 17 percent of the smaller subwatershed). An

estimated 140 acres would lose canopy cover (approximately 10 percent of the smaller subwatershed). These treatment units generally overlay north to northwest aspects.

The remainder of treatment units is concentrated in two smaller drainages that encompass Sections 30 and 31 at the northern edge of the project area. There would be approximately 152 acres of canopy reduction over northeast, north and northwest aspects in these units. This reduction in canopy represents approximately 18 percent of the 833 acres over these two smaller subwatersheds.

Tractor units would provide for the most canopy removal leading to these percentages. Canopy cover would be reduced over much of the activity units in Gold Creek subwatershed- especially in the tractor units, so there is potential for some effects(i.e. very localized and short term increases in peak flows and overland flow) in severe weather conditions (rain-on-snow events, severe floods, tornados, etc.), although the risk is minimal. These effects would be virtually immeasurable compared to the watershed response under background natural conditions.

The reason for this is that the project area is relatively small compared to the size of the watershed it overlays, and the proposed activities would not be expected to have an effect on infiltration runoff characteristics in activity units. The canopy removal would also be spread out spatially over the landscape, which further diffuses any potential for concentrating project related runoff and increasing downstream channel erosion. Therefore, the effects of a severe weather occurrence would be minimal in terms of water quality, impacts to stream channel form and function, or fish habitat.

Garfield Creek subwatershed would receive approximately 71 acres of treatment and Lake Face would not receive any treatment. It is unlikely that the relatively low amount of treatment area in Garfield Creek subwatershed would affect runoff or have an impact on rain-on snow events. The 71 acres of treatment is located in the upper slopes of the watershed and is a relatively small percentage of the total watershed area (two percent). Furthermore, the proposed units overlay east, south, and west aspects, which would disrupt the timing of runoff from each aspect and preclude the proposed units from contributing to any unified runoff scenario other than a rare large scale rain-on-snow (ROS) event. Therefore, increases in peak flows or annual water yield related to project activity would not be expected to occur.

The Lake Face Subwatershed would not receive any treatment activity, so there would be no change from the current condition. Implementation of the proposed action would not influence water quality, water yield, or fish habitat within the Lake Face Subwatershed.

In summary, implementation of the proposed action would be unlikely to produce negative effects through sedimentation, increased stream temperatures, changes in water yield, or decreased amounts of large wood for stream channel stability.

Cumulative Effects- Proposed Action

The cumulative effects area for this project is the same as the project boundary. Due to the nature of these lake face watersheds, the cumulative effects boundary is relatively limited in extent (see figure 2 in the project file hydrology report). The project area is bounded by Pend Oreille Lake on the north, northeast, and northwest. All of the proposed activities are hydrologically upstream from the lake, so extending the

cumulative effects boundary to the southwest and west would only serve to dilute potential cumulative effects associated with the proposed action. Past vegetation management projects were considered in this cumulative effects analysis if they still have a recovering effect, generally those projects implemented within the past 40 years. All known roads and residential development areas were also considered.

Past and current projects in or near the Gold Crown Fuels Reduction Project include timber harvest, road building, residential development, agricultural land use, mining, firewood gathering, and dispersed recreation. Within the project area there is an assortment of land ownerships including public Forest Service- and Bureau of Land Management-administered lands, private lands in forested settings utilized for residential use and commercial timber harvest, and private lands in agricultural settings utilized for pastures. The range of activities associated and within this cumulative effects area includes home construction, road building and maintenance, forest silvicultural activities (thinning, harvesting, and planting), and dispersed recreation.

Reasonably foreseeable future actions include continued residential development along and immediately uphill of the lakeshore, continued use of the transportation system, fuelwood and food gathering, recreation, possible wildfire suppression, fish and wildlife management, noxious weed treatments and incidental salvage following the project.

Overall, there is a substantial amount of past, current land use activity within the cumulative effects area. However, no cumulative effects to watershed resources resulting from this project would be expected to occur, since there are no expected direct or indirect effects to watershed resources within the project area. The implementation of RHCAs would prevent adverse effects to water quality from vegetation treatment unit activities, and impacts from roads and road use would be minimized with the implementation of BMPs (see design features related to water quality in Chapter II). Current and predicted sediment delivery from roads and road use activities is anticipated to be relatively small, so no measurable direct or indirect from these activities are expected to occur. Therefore, no measurable cumulative effects resulting from implementation of the proposed action would be expected to occur.

Consistency with the Forest Plan and Other Regulatory Direction

Given the above effects analysis and determination, and in consideration of design features described in Chapter II, the project hydrologist determined that implementation of Alternatives A and B would meet Forest Plan standards and guidelines related to water quality. Both Alternatives would also meet the requirements of Executive Orders 11990 and 11988, which apply to protection of wetland and floodplains. These features would be protected through implementation of BMPS and Forest Plan Standards and Guidelines. Both alternatives would also be consistent with the requirements of the Clean Water Act (33 U.S.C. 1251) and State of Idaho water quality regulations.

Rare Plants- Threatened, Endangered, Sensitive, and Forest Species of Concern

A detailed rare plants report is in the project file. The report discusses regulatory framework; analysis methodology; prefield and field survey results; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action; and consistency with regulatory direction. The following summarizes the information in that report.

Affected Environment

Field surveys for rare plants were conducted in 2007. The surveys targeted all areas proposed for treatments in the Gold Crown project area, as well as areas considered for treatment but subsequently dropped. During the surveys, occurrences of the Forest species of concern pine broomrape (*Orobanche pinorum* Geyer) were discovered in the project area, but not in proposed treatment areas. No other rare plants were identified, although several proposed activity areas were found to contain suitable habitat for pine broomrape and the sensitive species clustered lady's slipper (*Cypripedium fasciculatum* Kell.). Several wet forest guild microsites that have high potential to support rare moonworts and green bug-on-a-stick moss were identified in the project area – most treatment activities would not occur near these habitats. Wet forest guild microsites occur in or adjacent to a few proposed treatment areas. Complete results of field surveys are in the project file.

Environmental Consequences

Effects Common to Alternatives A and B

There are no listed endangered plant species suspected to occur in the IPNF and no listed threatened plant species suspected to occur in Bonner County (USDI 2008). No direct, indirect or cumulative effects to any federally listed plant species would occur with implementation of either alternative.

There is no aquatic, peatland, deciduous riparian, subalpine or cold forest guild habitat in the project area. Highly suitable wet forest guild habitat would be buffered from all project activities under Alternative B. No direct, indirect or cumulative impacts would occur to habitat or species of these guilds. Moist forest guild habitat outside of riparian areas was found to have low potential to support rare plant species other than moonworts or green bug-on-a-stick moss. No cumulative impacts would occur to moist forest guild species not suspected to occur in the project area; moist forest habitat in proposed treatment areas has low potential to support species of that guild other than rare moonworts and green bug-on-a-stick moss.

No direct, indirect or cumulative impacts to populations of clustered lady's slipper would occur, since this species was not found in the project area. Indirect and cumulative impacts to suitable habitat for clustered lady's slipper are discussed separately for each alternative. The documented occurrences of pine broomrape would not be directly impacted under either alternative. Under the No Action alternative, there would be no change in current management, while under the proposed action no treatment activities

are proposed in or near documented occurrences of pine broomrape. The potential for indirect and cumulative impacts to suitable habitat for pine broomrape are discussed separately for each alternative.

Alternative A - No Action

No direct effects to any rare plants would occur from implementation of this alternative. Indirectly, the continued increase in fuel loading could pose a threat to suitable rare plant habitat in the context of a higher risk of stand replacing fires. Such fires could extirpate the documented occurrences of pine broomrape and/or any undetected individual rare moonworts or green bug-on-a-stick moss. Habitat suitability for rare moonworts and clustered lady's slipper may be reduced from a high-intensity fire (see the rare plants report in the project file). In addition, oceanspray, the preferred host plant for pine broomrape, could be at least temporarily reduced in cover by a high-intensity fire (see the rare plants report in the project file).

When combined with the effects of past and ongoing fire suppression, implementation of the No Action alternative would further increase the risk of severe stand replacing fires. Should such a fire occur, it may impact populations and/or reduce habitat suitability for pine broomrape, green bug-on-a-stick moss, rare moonworts and clustered lady's slipper, at least temporarily. The No Action alternative could have low, moderate, or high cumulative effects to these species and/or suitable habitat. However, the occurrence and intensity of a future wildfire in suitable habitat for these species would be difficult to predict.

Alternative B - Proposed Action

Undetected individuals of rare moonworts and green-bug-on-a-stick moss may be directly impacted by project activities. Because moonworts appear adapted to a broad range of habitats, loss of undetected individuals is considered incidental. Marginally suitable habitat for rare moonworts and green bug-on-a-stick moss may be directly impacted by project activities. Cumulative impacts to rare moonworts and green bug-on-a-stick moss would be low (individuals, populations and/or habitat not likely affected) to moderate (individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level which could support sensitive plant species).

By reducing the risk of stand-replacing wildfires (see Fire/Fuels section), implementation of this alternative may have long term indirect benefits to habitat for clustered lady's slipper and pine broomrape. Cumulative impacts to suitable habitat for these species would be low (habitat not likely affected) to moderate (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 the species).

Consistency with the Forest Plan and other Regulatory Direction

Given the above effects analysis and determination, and in consideration of design features described in Chapter II, both alternatives would meet Forest Plan direction; in addition, the project is consistent with the Endangered Species Act (1973) as amended.

Noxious Weeds

A detailed noxious weeds report is in the project file. The report discusses regulatory framework; analysis methodology; field survey results; weed treatment records; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action; and consistency with regulatory direction. The following summarizes the information in that report.

Affected Environment

Documented weed species in the project area include the following:

Table III-10. Documented noxious weed infestations in the Gold Crown project area.

Species	Infestation Level*
spotted knapweed (*Centaurea maculosa* Lam.)	moderate
goatweed (Hypericum perforatum L.)	moderate
oxeye daisy (Leucanthemum vulgare L.)	low
meadow hawkweed (Hieracium pratense Tausch.)	low
orange hawkweed (Hieracium aurantiacum L.)	low
common tansy (Tanacetum vulgare L.)	low
sulfur cinquefoil (Potentilla recta L.)	low
Canada thistle (Cirsium arvense [L.] Scop.)	low

* A description of weed infestation levels is included in the project file.

These species occur along Forest roads in the project area. Spotted knapweed and goatweed also occur in natural openings in the project area, but off-road weed infestation levels are generally low overall and are scattered.

Environmental Consequences

Effects Common to Alternatives A and B

With implementation of either alternative, seeds from any weeds on private and Forest roads in the project area may still be transported within and out of the area by vehicles, people, birds, and wildlife. Untreated weed infestations on private lands in the project area could spread to public lands.

Under both alternatives, cumulative effects with regard to new invaders are expected to be low. Under Alternative A, because no new disturbance would occur, and because current treatment and monitoring would continue, no new invaders would be expected to become established. Under Alternative B, because of mitigation measures designed to detect and eradicate new invaders, no new invaders are expected to become established.

Alternative A - No Action

If no action were implemented, there would be no direct impacts on the risk or rate of weed spread, since management practices would not change from current conditions. Indirectly, the continued increase in fuel loading could increase the risk of weed spread in the context of a higher risk of stand-replacing fires.

Past wildfire suppression in the project area has increased the risk of severe, stand-replacing fires. Implementation of this alternative would not address these accumulated fuels in the project area. The risk of severe, stand replacing fires would be higher than under the proposed action. There would therefore be a higher risk of widespread vegetation and/or soil disturbance, which would cause an increased risk of weed spread and introduction across the project area.

In the short term, implementing no action would contribute a low level of cumulative effects to the risk of weed spread. Over the long term, not implementing the proposed action would further increase the risk of severe stand-replacing fires. Should such a fire occur, it would likely cause existing infestations to spread to previously uninfested areas. However, the occurrence of a future wildfire in the project area is difficult to predict.

Alternative B - Proposed Action

Implementation of the proposed action would increase the risk of weed spread to varying degrees. Weed prevention measures described in Appendix A would reduce but would not eliminate the risk of direct and indirect impacts from project activities.

Cumulative effects under the proposed action with regard to existing weed infestations are expected to be low for oxeye daisy, meadow hawkweed and Canada thistle, based on their current levels of infestation. Cumulative effects for spotted knapweed and goatweed would likely be moderate, given their current levels of infestation. Off-road infestations of spotted knapweed and common goatweed would be expected to persist, since these species are considered to be naturalized in the project area. Treatment of off-road infestations with biological control agents may reduce the size of the infestations but would not eliminate them.

Consistency with the Forest Plan and other Regulatory Direction

Given the above effects analysis and determination, and in consideration of the design features described in Appendix A, both alternatives would meet Forest Plan direction with regard to noxious weeds, Forest Service Manual Chapter 2080, as amended (2001), and Executive Order #13112 (1999).

Soil Resources

A detailed soils report is in the project file. The report discusses in detail the regulatory framework; analysis methodology; field survey results; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action; and consistency with regulatory direction. The following summarizes the information in that report.

Affected Environment

The Gold Crown Project Area encompasses forestlands that vary greatly in elevation, aspect, slope, forest type, disturbance history, and resilience to disturbance. The southern and western aspects of this area are dominated by shrubs, grasses, scattered timber and

rock outcrops. The northern and eastern slopes are dominated by dense forest stands with many draws and riparian areas throughout.

The parent geology of the project area consists of glaciated Precambrian metasedimentary Belt rocks of the Prichard Formation (see map 6, Appendix C of the soils report in the project file). Glaciated granitics and some alluvial deposits are present within the project area as well, but not in any proposed treatment units. Landscape morphology is primarily composed of straight to convex glaciated ridges and mountain sideslopes with some scoured sideslopes. Compacted glacial tills and rock outcrops can occur in these soils. A minor amount of floodplains, meadows, stream terraces, and scree slopes are scattered throughout individual proposed treatment units.

With respect to soils, most of the proposed treatment units are similar in one aspect: the topmost mineral soil horizon is volcanic ash. In the Gold Hill area, the ash is typically between 6 and 14 inches deep. The ash cap imparts both benefits and vulnerabilities to forest soil characteristics. Volcanic ash has a high water-holding capacity and provides an excellent germination substrate for many native plant species. However, ash is also extremely vulnerable to compaction, displacement and - when laid bare by disturbance - erosion. All soils are more sensitive to disturbance when moist, but ash-capped soils are especially sensitive when moist. Volcanic ash soils do not provide or hold plant-available nutrients well.

Soil Organic Matter, Soil Porosity, Soil Nutrients and Soil Productivity

Two soil properties are most influenced by timber harvesting and most related to forest integrity within the constraints of climate and topography - soil organic matter and soil porosity (Powers et al.1998). Soil nutrients are also an important component to soil productivity. These issues are the primary soil concerns for the Gold Crown project. Soil organic matter is influenced by fire, silvicultural prescriptions, timber harvests, and decomposition and accumulation rates. Soil porosity is most influenced by mechanical compaction and a lack of biophysical resiliency.

As mentioned above, ash soils in the Gold Hill area lack nutrients and nutrient-holding capacity relative to other soil types. Though ash-capped soils are sensitive to disturbance, soils in the Gold Crown project area are relatively resilient.

The Intermountain Forest Tree Nutrition Cooperative (IFTNC) has concerns that potassium might be limited on some types of parent material, specifically the belt meta-sediments. Under most natural circumstances, potassium returns to the soil when the tree dies. Unlike many other soil nutrients, potassium is derived primarily from the underlying geology, which consists of glaciated belt parent materials for all of the Gold Crown project area units.

Until minimum thresholds are developed through research, the IPNF is using management recommendations from the IFTNC as a guideline for maintaining sufficient potassium on a site. These measures have been incorporated into the design features described in Appendix A.

Landtypes and Hazard Ratings

Fifteen landtypes are mapped in the Gold Crown project area, and six of those are in harvest units identified in the proposed action (see map 5, Appendix C of the soils report in the project file). Descriptions of each landtype, detailed acreages, and maps displaying landtypes and hazards are contained in the project file. Table III-11 below displays the landtype hazard ratings associated with the proposed action, with subcategories for mass failure, surface erosion, landtype sensitivity, and soil productivity.

Table III-11. Summary of landtype hazards (in acres) associated with proposed treatment units.

Mass Failure Potential			Landtype Sensitivity			Surface Erosion Potential			Soil Productivity			
L	M	H	L	M	H	L	M	H	L	LM	M	MH
174	399	0	174	399	0	174	399	0	81	0	492	0
L – Low; M – Moderate; H – High; MH – Moderately High												

Mass Failure Potential: Thirty percent of landtypes in proposed treatment units have low mass failure potential; 70 percent have a moderate mass failure potential; and no landtypes in any proposed units have a high mass failure potential.

Landtype Sensitivity is the relative probability of eroded soil reaching a stream channel and becoming sediment. Seventy percent of proposed treatment units have moderate landtype sensitivity ratings. Thirty percent of the landtypes in the proposed units have low landtype sensitivity ratings and no landtypes within proposed treatment units have high sensitivity ratings.

Roads are considered a potential source for sediment delivery and are analyzed in detail in the specialist's report for hydrology (see the project file).

Surface Erosion Potential is a rating of the relative susceptibility of exposed soils to sheet and rill erosion. In the proposed treatment units, surface erosion hazard ranges from 30 percent(low) to 70 percent (moderate). None of the proposed units have a high surface erosion rating.

Periodic large pulses of erosion may occur during intense water yield and overland flow events in interaction with road drainage systems. Roads and their associated impacts are analyzed in detail in the specialist's report on hydrology (see the project file).

Soil productivity, the annual ability of the soil to produce plant mass, is low on 14 percent and moderate on 86 percent of the proposed treatment units. Table III-12 below indicates the acres of soils with low productivity in proposed treatment units.

Table III-12. Acres of low soil productivity in proposed treatment units.

Unit	Acres of Low Soil Productivity
1	10.12
4	7.67
7	1.43
10	36.07
21	1.15
25	16.64

Unit	Acres of Low Soil Productivity
31	8.19
Total	**81.27**

Existing Disturbance

The proposed treatment units display a wide variety of existing soil conditions. Table III-13 below shows the acreage of different soil conditions with regard to disturbance, and table III-14 displays the current conditions by unit.

Table III-13. Acres by disturbance category in proposed treatment units.

Disturbance Category	Acres
Undisturbed or slightly disturbed (0-5.99%)	542
Moderately disturbed (6-9.99%)	31
Highly disturbed (10% +)	0

Table III-14. Current conditions in proposed treatment units.

Unit #	Down Woody Debris (T/Ac)	Coarse Fragments	Total Organics (cm)	Existing Detrimental Disturbance
1	--	--	--	2%
2	10	20-30%	3.0	2%
3	9	10-30%	3.0	2%
4	6	5-30%	1.8	2%
5	10	20-30%	2.8	0%
6	6	5-30%	1.9	2%
7	12	10-20%	4.0	0%
8a	12	10-20%	4.0	0%
8b	12	10-20%	4.0	0%
8c	12	10-20%	4.0	0%
8d	12	10-20%	4.0	0%
9	6	5-30%	1.9	2%
10	6	5-30%	1.9	2%
11	9	15%	3.0	9%
12a	5	35%	2.0	0%
12b	5	35%	2.0	0%
14	5	35%	2.0	0%
15	12	<5%	2.9	0%
16	--	--	--	0%
17	15	10-20%	3.0	1%
18	15	10-20%	3.0	1%
19	17	5-10%	1.6	2%
20	10	5-10%	3.9	0%
21	17	<5%	3.9	0%
22	10	<5%	1.8	7%

Unit #	Down Woody Debris (T/Ac)	Coarse Fragments	Total Organics (cm)	Existing Detrimental Disturbance
23	17	5-10%	1.6	2%
25	9	5-10%	3.3	0%
26	15	5%	2.4	0%
27	9	5-25%	2.9	2%
28	--	--	--	0%
29	--	--	--	2%
30	6	5-30%	1.9	2%
31	11	10-20%	4.0	0%
32	15	5%	2.4	0%
33	22	<5%	3.8	0%
34	7	5-10%	2.5	0%

Down Woody Debris and Soil Wood: Most of the units are lacking sufficient coarse woody debris. Soil wood (the decomposition product of brown cubical rot) is common in most units, but large trees necessary for future soil wood contributions are uncommon.

Coarse Fragments: The percent of coarse fragments is a measure of rock content in the surface six inches of mineral soil. Rock content is an excellent indicator of the effect of compaction on a specific soil type. Rock content over 35 percent will greatly reduce the effect of mechanical compaction. As table III-15 indicates, rock content for many of the units is below 35 percent, meaning that these soils are especially vulnerable to compaction.

Total Organics: This is a measure of the total depth of the combined litter and duff organic horizons. This measure is another indicator of bio-physical resiliency. The depth and character of the organic horizon influences soil structure, moisture-holding capacity, nutrient cycling, pH, and soil temperature. Organic horizon depths in the range of three to five centimeters are typical for this forest type. As table III-15 indicates, the litter and duff layers in many proposed treatment units are a bit shallow (i.e. less than three centimeters). However, since charcoal is present in most of these units, the litter layer is still developing after the last wildfires.

Detrimental Disturbance: There are no highly disturbed units in the proposed activity areas. Two units have moderate current soil disturbance. Units 11 and 22 have more recent harvest activity and skid trails present, but the sites are recovering and are resilient.

The remaining proposed units have little or no detrimental disturbance; most experienced at least one burn in the early 1900s. The litter layer and soil organic matter in these units have been developing but are not yet mature, and there are very few signs of past timber harvest or other soil damaging activities.

Environmental Consequences

Environmental consequences of the proposed action and no action were analyzed based on the results of field surveys and on peer-reviewed literature, professional judgment of the project soils specialist and the design criteria described in Chapter II (see Features Designed to Protect Soil and Soil Productivity).

Effects Common to Both Alternatives

Cumulative Effects

Cumulative Effects of Recreation: Disturbance from general motorized use and recreational access has been occurring and will continue throughout the project area indefinitely. No changes in the existing recreation profile are anticipated under either alternative. Other recreational activities that occur off the developed roads, such as the gathering of miscellaneous forest products and hunting, are generally carried out on foot and have no additional effects on soils. Under the proposed action, unauthorized off-road motorized use would be discouraged through implementation of design features described in Chapter II.

Cumulative Effects of Noxious Weeds: Noxious weed monitoring and treatment would occur as needed and would follow guidelines established in the Sandpoint Ranger District Noxious Weeds EIS (USDA, 1995). Effects to soil resources were analyzed in that document and its adaptive strategy. No additional effects to soils beyond those analyzed for and disclosed in the EIS are expected to occur.

Alternative A - No Action

Direct and Indirect Effects

For undisturbed to moderately disturbed sites, implementing no action would have no direct impacts on forest soils. Indirectly, no action alternative would allow developing litter layers to mature. Untreated, self-thinning stands would contribute woody debris to decompose, adding needed organics and soil wood.

However, the continued accumulation of untreated fuels would increase the risk of a wildfire occurring in the project area. The occurrence of a high-intensity wildfire would have an increased potential for impacts to soils and soil productivity in severely burned areas, especially since the risk of soil erosion increases proportionally with fire intensity (Megahan 1990). Other potential effects could include the potential loss of organics, loss of nutrients, and a reduction of water infiltration (Wells et al. 1979). Burns that create very high soil-surface temperatures, particularly when soil moisture content is low, result in an almost complete loss of soil microbial populations, woody debris, and the protective duff and litter layer over mineral soil (Hungerford 1991, Neary et al. 2005). Nutrients stored in the organic layer (such as potassium and nitrogen) can also be lost or reduced through volatilization and as fly ash (DeBano 1991, Amaranthus et. al. 1989).

Fire-induced soil hydrophobicity is presumed to be a primary cause of the observed post-fire increases in runoff and erosion from forested watersheds (Huffman et al. 2001). Though hydrophobicity is a naturally occurring phenomenon that can be found on the mineral soil surface, it is greatly amplified by increased burn severity (Doerr et al. 2000, Huffman et al. 2001, Neary et al. 2005).

Soil hydrophobicity usually returns to pre-burn conditions in no more than six years (DeBano 1981). Dyrness (1976) and other studies have documented a much more rapid recovery of one to three years (Huffman et al. 2001). The persistence of a hydrophobic layer would depend on the strength and extent of hydrophobic chemicals after burning

and the many physical and biological factors that can aid in breakdown (DeBano 1981). This variability means that post-fire impacts on watershed conditions would be difficult to predict and to quantify.

If hydrophobic soils result from a severe high-temperature fire, moderate to high surface erosion could occur, but the potential for mass failures would be low to moderate because of the project area's overall landtype characteristics. However, localized slope movement could be possible, especially along roads on steeper mountain slopes.

Cumulative Effects

Under the No Action alternative, wildfire suppression in the project area would be expected to continue. Natural ecological processes, including forest stand succession and tree mortality, would also continue. When the indirect effects of this alternative are added to future wildfire suppression and natural forest ecological processes, additional accumulations of down, woody debris (or fuels) would remain untreated, resulting in a higher fire hazard prior to the next stand-replacing fire event.

Should such a fire occur, the potential for detrimental indirect effects to soils may include an increased loss of organics, loss of nutrients, reduction in water infiltration, loss of soil microbial populations, loss of woody debris, loss of protective duff and litter layer over the mineral soil horizons, an increase in risk of hydrophobicity resulting from fire, and associated increases in the risk of post-fire runoff and erosion.

Alternative B - Proposed Action

Direct Effects

Potential adverse soil disturbance can occur from timber harvesting, yarding, fuels treatment and road construction.

Timber Harvest Activities

The amount of expected detrimental disturbance varies greatly with different treatments. Detrimental disturbance levels were estimated using Niehoff (2002) as well as ground truthing, and take into account best management practices described in Niehoff (2002). Table III-15 below illustrates expected effects based on a variety of proposed treatments and scheduled season.

Table III-15. Methods of fuels treatment, acres of harvest, and predicted additional disturbance under the proposed action, based on Niehoff (2002) and on-the-ground observations. Predicted disturbance values assume no re-use of existing skid trails or landings (such re-use has been determined to be feasible within some units and is calculated in table XX at the end of this section).

Harvest System/Fuel Treatment	Acres	Predicted Additional Detrimental Disturbance
Hand thin / Slash, Hand pile/Burn	6	0%
Helicopter harvest / Broadcast burn	23	0-2%
Helicopter harvest / Yard unmerchantable	42	0%
Skyline harvest / Broadcast burn	189	0-2%
Skyline harvest / Excavator pile corridors	36	5%
Skyline harvest / No slash treatment	13	0%

Harvest System/Fuel Treatment	Acres	Predicted Additional Detrimental Disturbance
Mechanical harvest / Broadcast burn	50	6-13%
Mechanical harvest / Grapple pile and burn	171	8-11%
Harvester (cut-to-length) / Forwarder yard (operate on slash mat) / Grapple pile and burn (Units 11 and 22)	32	11%
Tractor swing / Grapple pile and burn	11	11%
Total Acres	**573**	

Ground-based Logging: Units 11 and 22 have existing soil disturbance of nine percent and seven percent, respectively. Approximately half the existing skid trails and landings within these units would be reused. Required design features for these units include using cut-to-length logging systems, which operate off of a slash mat, and restricting machines to skid trails. Such design features would ensure that total detrimental soil disturbance in these units would not exceed 15 percent (see Table III-17 at the end of this section). In the remainder of units proposed for ground-based harvest, additional detrimental soil disturbance of from 6-13 percent is predicted (see Table III-17 at the end of this section).

Skyline and Helicopter Logging/Hand Thinning: Approximately 65 acres are proposed for helicopter logging, which is predicted to cause little to no detrimental soil disturbance, depending on the fuels treatment. Hand thinning on six acres is also predicted to cause no additional detrimental soil disturbance. Skyline harvest on approximately 238 acres is predicted to cause varying amounts of additional soil disturbance, depending on the fuels treatment.

Prescribed broadcast burning may cause detrimental soil disturbance, particularly when soil moisture is less than 25 percent. Required design features include prescribed burning only when soil moisture is at least 25 percent. In addition, sites to be broadcast burn would have a minimum six months' delay between harvest and burning to allow fine fuels to decompose and larger fuels to become more fully in contact with the soil, thus reducing their chance of complete combustion (see Chapter II Features Designed to Protect Soils and Soil Productivity).

Road Construction: New system road construction is planned that would bisect Units 2 and 3. New temporary road would be built to access Unit 34. Existing road prisms bisect proposed units 4 and 6. Table III-16 below displays the road mileage by unit.

Table III-16. Existing and proposed system road mileage by proposed harvest unit.

Unit	Acres	Temporary Road (ft)	New System Road (mi)	Existing System Road (mi)
2	60	--	0.3	--
3	18	--	0.4	--
4	24	--	--	0.10
6	22	--	--	0.10
34	6	685	--	--

Newly constructed system roads become dedicated uses, and the acreage lost is removed from the sustainable land base (USDA 1999b). Approximately 2.2 miles of new system

road construction is proposed. Approximately 0.3 mile and 0.4 mile respectively would be constructed in Units 2 and 3, resulting in a loss of 0.9 acre and 1.2 acres respectively in those units.

Approximately 0.13 mile of new temporary road is also proposed, of which about 100 feet would pass through Unit 34. Disturbance from temporary road construction in this unit would total about one percent of the unit acres. The new temporary road would be restored to contour and revegetated following completion of project activities.

Indirect Effects

Project activities may have indirect effects on soil nutrient levels. For example, harvesting on all sites would remove within each tree bole (and bark) about 22 percent of the potassium that is contained within a tree (Garrison-Johnston et al. 2004). This may have an indirect effect on some plants that remain in the stand. The commercial removal of Douglas fir, grand fir, western cedar, and hemlock in association with leaving western larch would allow the release of stored foliar potassium as a beneficial nutrient for uptake by western larch (Garrison-Johnston et al. 2007, Garrison and Moore 1998). Western larch is a more potassium-efficient species and would remain throughout those units where it already is part of the stand component.

Measuring the effects of on-site productivity, however, cannot be done with certainty until more research information becomes available. At this time, management recommendations from the IFTNC are used as guidelines for maintaining sufficient potassium on a site.

Prescribed fire can increase available nitrogen for one to two years. Burning slash piles could create extremely high temperatures in concentrated areas that could lead to loss or phosphorus and potassium and volatilization of nitrogen (DeBano 1981). By maintaining organic matter and ground cover on at least 85 percent of the site, nutrient cycling and availability should not be altered. Localized losses may occur under burn piles, at landings, or where severe fire occurs. As noted above, design features to allow prescribed fire only when soil moisture is at or above 25 percent would reduce the risk of adverse effects to soils from severe fire.

By reducing the risk of future severe wildfires and increasing forest health, implementation of the proposed action could indirectly decrease the risk of adverse effects to soils - including loss of nutrients and organic matter - from high intensity wildfire.

Proposed road reconstruction (0.3 mile) and maintenance (8.5 miles) could increase short-term sediment movement from road surface runoff, but such movement would be minimal, especially where road locations are higher on the slope and are at a relatively low gradient. For a detailed discussion on roads and road-related issues, refer to the hydrology report in the project file.

Cumulative Effects

Cumulative Effects of Harvest Activities: The proposed treatments would employ low-impact logging techniques that minimize soil disturbance and maintain processes that promote natural soil biophysical resiliency (see design features in Chapter II). No other

activities are planned in the foreseeable future in the project area; grazing has not occurred and will not occur in the foreseeable future.

As noted above, the requirement for cut-to-length logging systems, use of existing skid trails and landings where possible, and the restriction of machines to skid trails in Units 11 and 22 (see design features in Chapter II) would ensure that cumulative detrimental soil disturbance would not exceed 15 percent in these units. Units 11 and 22 have been selected for effectiveness monitoring.

Units that have potential potassium concerns would have slash left on site for at least one wet season in order to allow leaching of important nutrients back into the soil. Units where this is not possible and unmerchantable materials will be yarded (25, 26, and 28) are estimated to currently have at least 1-2 tons/acre of fine materials and will gain at least 1-2 tons/acre, due to harvest/yarding related breakage. Units 2 and 8a may also incur some yarding of unmerchantable material; however, the majority of these units will be broadcast burned following appropriate slash-leaching. Because these sites have not had previous harvest, this would be sufficient to retain potassium on site.

Cumulative Effects of Road Construction: As noted above, areas lost to new system road construction would be excluded from long term soil productivity assessments (USDA 1999b, Niehoff 2002). Based on the small amount of acreage lost in the two affected units, and with features designed to reduce adverse effects to soils during and after road construction, cumulative effects to soils from new road construction would be negligible.

Cumulative Effects of Fire and Fire Suppression: In 1922 the last recorded large stand-replacing fire occurred in the project area. At least one other unrecorded, large fire likely occurred in the project area between 1926 and 1932 (see the vegetation report in the project file). Since then the project area has not experienced a large wildfire, and fire suppression efforts have kept fires relatively small. The affected areas have recovered, and no observable lasting effects to soils were found as a result of previous wildfires.

Active fire suppression has protected much of the Gold Crown area over the past decades but has added to increased fuel loading. The proposed harvest would aid future suppression activities by reducing current levels of infected dead and dying trees, thereby reducing the potential for larger scale fires. The benefits of fires with lower intensity and severity would include a reduced potential of excessive soil heating and sterilization as well as hydrophobic conditions that tend to increase sediment movement, flooding, and possible slope instability (deDios Benavides-Soloria and McDonald 2005, Neary et al. 2005).

On small wildfires, soil disturbance from fire suppression activities is usually caused by hand tools; most hand fire-line construction has only minor (insignificant) impacts to the soil resource. During fire suppression, closed roads may be reopened for access and incorporated as fire line. As part of the post-fire work, the areas of disturbance are rehabilitated and the roads returned to their previous condition in most cases.

Compliance with the Forest Plan and Other Regulatory Direction

The project soils scientist concluded that, based on the above analysis and in consideration of the design features described in Chapter II, the proposed action would

comply with Forest Plan standards (USDA 1987) and Regional Soil Quality Standards (USDA 1999b) related to detrimentally disturbed soils.

Summary of Effects Table

Table III-18 below displays the expected effects of the proposed activities, by unit, on soils in the project area. The determination of effects considered design criteria presented in Chapter II (see Features Designed to Protect Soils and Soil Productivity) and past, current and ongoing, and reasonably foreseeable actions.

Note that the impacts of past harvest combined with the proposed treatments are not wholly additive because of design features that include use of existing skid trails and log landings where feasible.

Table III-17. Summary of existing conditions and potential impacts for the Proposed Action following guidelines in Niehoff (2002) and the regional guidelines (1999b). Forest plan standards which integrate system roads into the analysis are addressed in Appendix C. Predicted additional detrimental disturbance percentages may not be equal to those projected in Table 5, as many of these units have existing levels of disturbance (related to existing skid trails, etc.) which will likely be re-used for this project. These predictions take into account the percentage of existing disturbance which can be re-used. (T=Tractor, CTL=cut to length, YUM=yard unmerchantable material, GP=grapple pile, B=burn, BB=broadcast burn, H=handpile, EPC=excavator pile corridors).

Unit #	Acres	Silviculture Prescription	Harvest System	Slash Abatement	Current Detrimental Disturbance (%)	Predicted Additional Detrimental Disturbance (%)	Estimated Total Detrimental Disturbance (%)-
1	15	Thinning	T or CTL	GP/B	2	11	13
2	60	Regeneration	Skyline	BB	2	3	5
3	18	Thinning w/ Group Selections	T or CTL	GP/B	2	12	14
4	24	Thinning w/ Group Selections	T or CTL	GP/B	2	12	14
5	7	Hazardous Fuels harvest; rock outcrops	Skyline	BB	0	2	2
6	22	Thinning	T or CTL	GP/B	2	11	14
7	14	Thinning w/ Group Selections	Combination (T/linepull)	BB	0	13	13
8a	22	Thinning w/ Group Selections	Skyline	BB/YUM	0	2	2
8b	12	Thinning	Skyline	EPC	0	5	5
8c	9	Regeneration	Skyline	BB	0	2	2
8d	4	Thinning	Skyline	EPC	0	5	5
9	7	Thinning	Skyline	None	2	1	3
10	36	Regeneration	Combination (T/linepull)	BB	2	12	14
11	17	Thinning	CTL	GP/B	9	5-6	14-15
12a	19	Thinning w/ Group Selections	Skyline	BB	0	2	2
12b	11	Thinning w/ Group Selections	Tractor Swing	GP/B	0	13	13

Unit #	Acres	Silviculture Prescription	Harvest System	Slash Abatement	Current Detrimental Disturbance (%)	Predicted Additional Detrimental Disturbance (%)	Estimated Total Detrimental Disturbance (%)-
15	23	Thinning w/ Group Selections	Helicopter	BB	0	2	2
16	4	Thinning	T or CTL	GP/B	0	13	13
17	36	Thinning w/ Group Selections	Skyline	BB	1	2	3
18	12	Thinning w/ Group Selections	T or CTL	GP/B	1	13	14
19	20	Thinning w/ Group Selections	T or CTL	GP/B	2	13	14
20	8	Regeneration	Skyline	BB	0	2	2
21	16	Thinning	T or CTL	GP/B	0	13	13
22	15	Thinning w/ Group Selections	CTL	GP/B	7	6-7	13-14
23	6	Overstory Removal	Skyline	None	2	1	3
25	19	Regeneration	Helicopter	YUM	0	0	0
26	9	Regeneration	Helicopter	YUM	0	0	0
27	23	Regeneration	Mechanical or Helicopter	BB	2	11** or 0-2	13** or 4
28	13	Regeneration	Helicopter	YUM	0	0	0
29	19	Thinning	Skyline	EPC	2	3	5
30	6	Regeneration	Skyline	BB	2	1	3
31	11	Thinning	T or CTL	GP/B	0	13	13
32	6	Hand Thin/Slash	Hand	HP/B	0	0	0
33	4	Hazardous Fuels harvest; rock outcrops	Skyline	BB	0	2*	2
34	6	Regeneration	T or CTL	GP/B	0	14	14

**with mechanical harvest

Recreation Resources

A recreation specialist's report is in the project file. The report discusses regulatory framework; analysis methodology; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action; and consistency with regulatory direction. The following summarizes the information in that report.

Affected Environment

The following recreation use areas in the project area may be impacted by the proposed activities or by the No Action alternative:

Forest Road 2642: Contest Mtn. Road (Forest Road 2642) is a local favorite for dispersed recreation activities, including hiking, hunting, driving for pleasure and gathering forest products such as firewood and huckleberries. Because it is close to Sandpoint, most use is day use with some occasional camping. The main road is used by mixed traffic including cars, trucks, ATVs, mountain bikes and horseback riders.

Gold Hill Vista Trail #1 is a short trail to a scenic overlook. It is a hardened barrier-free trail with the trailhead located at a small turnout along Road 2642. Suitable for wheelchairs and strollers, this trail offers panoramic views of Lake Pend Oreille and the surrounding mountains.

Gold Hill ATV Trail #2 was constructed in 1994 for cross-country skiers; the predominant use on the trail is ATV riders and mountain bike riders. The upper trailhead is located at the end of Road 2642 and the lower trailhead is located at a small turnout along Road 2642. Mountain bike riders use this as an extension of Gold Hill Trail #3 and ATV riders can loop back by using Road 2642. Use is moderate to high.

Gold Hill Trail #3 was constructed in 1992; it is one of the most popular trails on the district because it has easy access, is close to town, is in a natural forest setting, and offers panoramic views of Lake Pend Oreille. This trail receives very high use (1500+ visitors per year) in the peak summer months (June to September), high use in the "shoulder" seasons and moderate use in the winter months. Use is equally split between hikers and mountain bike riders, with occasional use by horseback riders. This trail also receives regular use in the winter season from hikers/snowshoers. The main trailhead located on Bottle Bay Road is paved with parking for 10 vehicles and has a modern vault toilet. The upper trailhead is located on a turn out along Road 2642.

Environmental Consequences

Effects Common to Alternatives A and B

Direct, Indirect and Cumulative Effects

With implementation of either alternative, recreation use in the project area would be expected to continue at current levels. Over time as the population of the local area

continues to grow, more and more people will seek out recreation opportunities close to home, such as the Gold Crown area.

Gathering forest products, driving for pleasure, hiking, mountain bike riding and hunting will continue to be the predominant recreational uses in the area.

Alternative A – No Action

Direct and Indirect Effects

Under the No Action alternative, there would be no direct effects to recreation use. Indirectly, however, fuels in the project area would continue to accumulate without treatment (see Fire/Fuels section). Untreated accumulated fuels would increase the risk of widespread, severe wildfire.

Cumulative Effects

In the event of a future wildfire, project area roads and trails may be affected, which could at least temporarily reduce their appeal to recreational users. The No Action alternative could therefore have low to moderate cumulative impacts to recreation in the project area. However, the occurrence, location and extent of such a wildfire cannot be predicted with certainty.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Direct and indirect effects to roads and trails in the project area would be as follows:

Forest Road 2642: Under this alternative, recreational users using this road may be temporarily inconvenienced during active logging and/or hauling operations. Design features described in Chapter II would minimize those impacts to the extent that public safety allows.

Almost 2.5 miles of new permanent road would be constructed under the proposed action. These roads would be available for dispersed recreation opportunities such as hunting, camping, hiking, gathering huckleberries and mountain bike riding. The new roads would also provide more non-motorized recreation opportunities and would disperse visitors over a larger area, thereby reducing impacts to other high use areas.

Gold Hill Vista Trail #1: No activities are proposed near this trail; there would be no impact.

Gold Hill ATV Trail #2: Lower sections of Trail #2 are located in Unit 11. The proposed silvicultural treatment in Unit 11 is a light thinning, followed by grapple-piling of slash.

The immediate short-term impact would be the appearance of a “logging operation” such as fresh cut stumps, limbs and tops, skidder or tractor tracks adjacent to or across the trail. Visitors may also be inconvenienced during the project if the work is done during the peak summer season and the trail is closed for a short period of time. However, design features, which include restricting harvesting during the period from June through

September, would reduce those impacts (see Features Designed to Protect Recreational Resources in Chapter II). Impacts from the timber harvest would be reduced over time, and the logging operation would have no long-lasting visual impacts. After one to two seasons, raw stump surfaces would fade, ferns and other brush would grow up, and the harvest unit would have a more natural appearance.

Gold Hill Trail #3: The upper trailhead and sections of trail are located in or adjacent to Units 21, 25, and 32. The proposed silvicultural treatment for Unit 21 is a light thinning. For Unit 25, a dry-site regeneration treatment is planned, and within Unit 32 hand treatment only would be performed to clean up hazard trees and woody debris accumulations adjacent to the trail.

The immediate short-term impact adjacent to Units 21 would be the appearance of a "logging operation" such as fresh cut stumps, limbs and tops, skidder or tractor tracks adjacent to or across the trail. Within Units 25 and 32, fresh-cut stumps and some slash may be visible from the trail system. Visitors may also be inconvenienced during the project if the work is done during the peak summer season and the trail is closed for a short period of time. However, design features, which include restricting harvesting during the period from June through September, would reduce those impacts (see Features Designed to Protect Recreational Resources in Chapter II).

Impacts from the timber harvest would be reduced over time, and the logging operation would have no long-lasting visual impacts. After one to two seasons, raw stump surfaces would fade, ferns and other brush would grow up, and the harvest unit would have a more natural appearance. The project would also likely result in some benefits to trail users, including enhanced vistas (especially adjacent to Unit 25) and the treatment of existing brush piles along the lower portion of the trail (within Unit 32.)

Cumulative Effects

Based on the above discussion and on design features described in Chapter II, cumulative impacts to recreation in the project area are expected to be low - impacts would be temporary in nature and, for Gold Hill Trail #3, beneficial impacts would be expected (see above).

Consistency with the Forest Plan and other Regulatory Direction

Both alternatives comply with Forest Plan forest wide goals for recreation. The proposed action also complies with specific Management Area (MA) goals because the Recreational Opportunity Spectrum (ROS) class would remain unchanged for each of the management areas.

Visuals/ Scenery Management

A detailed visuals/ scenery management report (the Visual Quality Objective (VQO) and Scenery Management Analysis) is in the project file. The report discusses in detail the regulatory framework; analysis methodology; required mitigation and monitoring; the direct, indirect and cumulative effects of implementing the proposed action and no action

alternatives; and consistency with regulatory direction. The following summarizes the information in the visuals/ scenery management report.

Affected Environment

The Visual Quality Objectives (VQOs) identify a desired level of scenic quality and diversity within a landscape based on physical and sociological characteristics. VQOs are based on the area as seen from sensitive travel corridors and on other unique landscape features that result in a particular visual sensitivity level. In the Gold Crown Fuels Reduction Project (FRP) area, most of the proposed treatment units are located within high visual sensitivity areas, as seen from Highway 95, Highway 2, Highway 200, Bottle Bay Road, the Gold Hill Trail, or from Lake Pend Oreille. Therefore, the potential impacts that the proposed activities could have on the visual or scenic values of the area were analyzed in detail. Units were analyzed based upon the vantage points or corridors from which they can be viewed. In addition, design criteria and mitigation measures were included in the proposed action to minimize impacts to visual and scenic quality.

This project could potentially affect the scenic values of the area by altering the form, line, color, texture, and pattern of the immediate landscape as seen from particularly sensitive viewing locations. Therefore, for the scope of this analysis the sensitive viewing locations were identified, the current scenic condition of the proposed treatment units have been described, and the effects of the no-action alternative and the proposed action alternative have been analyzed in context of both the immediate and surrounding landscape.

The Gold Crown FRP is located in an area commonly known as Gold Hill or Gold Mountain. Portions of Gold Hill are viewable from many different vantage points and travel corridors. The Gold Hill area is characterized by very broken topography and extruded rock outcrops. There are stream courses scattered around the hillside, but the geology has also resulted in many benches/extrusions perpendicular to stream courses. Many of these benches cannot be seen from any view angle other than the air, and as a result, are hidden from the high scenic integrity corridors. Also, many aspects in mid to upper slopes are hidden from the high scenic integrity corridors due to their spatial arrangement or position in relation to drainages.

The Gold Crown FRP area is visible in part from locations identified in the Forest Plan as having a high sensitivity and concern for the scenic quality of the area (see photos in the visuals section of the project file). The travel corridors of US Highway 95, Highway 2, Highway 200, and the Bottle Bay Road, as well as areas visible from the City of Sandpoint and Lake Pend Oreille are the locations of highest concern. However, due to the extent of use, visibility from Forest Service Road 2642 and the Gold Hill Trail (Trail Number 3) will also be analyzed. At present, human use and development is very obvious on private and industrial lands within and adjacent to the project area. However, road construction and previous land management activities on National Forest System (NFS) lands in the project area are less obvious.

Environmental Consequences

As described in the Scope of Analysis, the proposed project could potentially affect the scenic values of the area by altering the form, line, color, and texture of the immediate landscape as seen from particularly sensitive viewing locations. This section will describe these alterations, the effects they may have on the immediate and surrounding landscape, and mitigation measures that would minimize the potential detrimental effects.

Table 1 below describes the proposed activities, existing condition and visual quality objective (VQO) for each treatment unit, as well as the effects those proposed activities may have on the immediate and surrounding landscape.

The No-Action Alternative is not described in the table, but assumes the following: no thinning; no thinning with group selection harvests; no regeneration harvests and subsequent replanting; no overstory removal with associated precommercial thinning of understory; no special hazardous fuel treatments on rock outcrops; no hand thinning/slashing; and no road construction or reconditioning will be performed. Regular, scheduled road maintenance and weed treatment will continue to be performed. In addition, forest succession will continue, and wildfire suppression and recreational activities will continue to occur as in the past in the project area. Therefore, the no-action alternative would not result in any direct effects to visuals resources. However, indirect effects from continued forest succession and forest health problems are discussed.

The no action alternative could also indirectly result in a higher risk of a stand-replacing, high-intensity wildfire (see Fire, Fuels, and Air Quality report.) A high-severity fire is not certain to occur within the project area during a given timeframe. However, the occurrence of a high-intensity wildfire would have an increased potential for negative impacts to visuals resources. Such impacts could last for 5-20 years, until a severely-burned site revegetates, and potential impacts are described in the context of the table below.

We can assume that within this project area, which is entirely within the wildland-urban interface, a foreseeable, future actions is wildfire suppression. Land management agencies and those with firefighting responsibilities in the area will have to continue to fight wildfires in the area to protect homes, private property, and public infrastructure. Additionally, natural ecological processes, including forest stand succession and tree mortality will also continue to occur. When the indirect effects of the no-action alternative are added cumulatively to the future wildfire suppression and natural forest ecological processes, we can predict there will be additional accumulations of down, woody debris (or fuels) and a higher fire hazard prior to the next stand-replacing fire event. In this case, the potential detrimental indirect effects to visuals resources would be similar to those described above, but potentially longer-lasting.

Table III-19. Existing Condition, VQO and Proposed Activity Effects for each Treatment Unit

Unit	*VQO*	*Existing Condition*	*No-Action Alternative (Alt. A) Effects*	*Proposed Action (Alt. B)*	*Proposed Action (Alt. B) Effects*
1	Retention	Southern end of unit visible from 2642 Rd (foreground); northern end of unit visible from portions of Bottle Bay (far middleground). Dense Douglas-fir/cedar forest stand, mesic type. Lots of dead and dying trees evident—root disease prevalent. Currently meets retention status, but on northern end of unit where unit abuts private land facing Bottle Bay, the obvious line between private and NFS is striking and distinctly human.	Vertical line form adjacent to north-eastern end of unit, along private property boundary, will remain obvious. Forest stand will continue to succumb to root disease, and the subsequent mortality could lead to color or textural differences obvious from Bottle Bay and the 2642 Road	Thinning; Grapple-piled slash Favored for retention are largest and healthiest larch and cedar, as well as healthy, relic Douglas-fir.	Casual visitors would likely not notice any human activities within the unit, and the unit would remain in retention. Many, healthy, western larch, cedar and Douglas-fir would be visible from the 2642 Road. Thinning would focus on removing smaller, less thrifty individuals, as well as providing for growing space between trees. Treatment would soften line effect adjacent to private property on northern end of unit. Low stump heights adjacent to the 2642 Road should be favored.
2	Retention	From an open road spur off of the 2642 Rd, only the dense trees nearest the road are visible, due to steepness of topography. Parts of the stand are visible from Bottle Bay. An obvious line along the eastern edge of unit, where the unit abuts private land, is present. Several rock outcrops and root disease epicenters are plainly visible from Bottle Bay. The stand is comprised of Douglas-fir, hardwood species, and larch, with lesser amounts of cedar. Lots of stem and root decay.	Vertical line form adjacent to eastern edge of unit, along private property boundary, will remain obvious. Forest stand will continue to succumb to root disease, and the subsequent mortality could lead to color or textural differences obvious from Bottle Bay and the 2642 Road	Regeneration harvest/ irregular shelterwood; Slash treatment to be a combination of Prescribed Burning and Yarding Unmerchantable Material Southeastern portion of unit near 2642 Rd will only be lightly thinned, but regeneration harvest will occur lower on slope, with 3-5 large shelterwood openings (no single opening >40acres)	For the first few years after harvest, most of this stand would probably be categorized as partial retention, transitioning back to retention as understory vegetation growth camouflages stumps and regeneration has a growth flush. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) adjacent to 2642 Rd, identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the 2642 Rd., and mimicking adjacent patch sizes and shapes for shelterwood harvest. Individual tree selection elsewhere in unit will favor retention of the largest and healthiest tree in the immediate area.
3	Retention	Unit is adjacent to 2642 Rd. Due to the unit location being primarily in a swale, very little of unit is visible from Bottle Bay. Only convex portions of unit and rock outcrops which have northeastern aspects are visible from Bottle Bay. Stand has a nice mix of cedar, Douglas-fir and larch. However, some portions of the unit are extremely dense, which has lead to lots of mortality and windthrow, especially adjacent to unnamed open spur off 2642 Rd. Root disease prevalent in DF. The unit is predominantly within retention status, but root disease patches are only in partial retention status.	Natural succession and tree mortality would continue to occur, potentially resulting in more woody debris in the understory. In addition, the dense canopies would become denser and potentially create an understory completely devoid (depauperate) of live vegetation, like shrubs or forbs. Likely the retention status of this unit would not change for quite some time, barring a substantial disease/insect outbreak or landscape fire event which could kill the entire stand.	Thinning with Group Selection openings; Grapple-piled slash Group selection of very dense trees adjacent to unnamed spur road and an isolated root disease center is necessary. Thinning within remainder of stand will favor retention of healthiest and largest trees.	For the first few years after harvest, the portion of the unit adjacent to the unnamed open spur road would probably be categorized as partial retention, transitioning back to retention as understory vegetation growth camouflages stumps and new tree seedlings initiate. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact adjacent to the road. The remainder of the unit would likely remain in retention status, as viewed from the lake and the 2642 Road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
4	Retention	Fairly open stand of Douglas-fir, larch, and some cedar adjacent to the 2642 Rd and 2642 C spur. Many Douglas-fir are succumbing to root disease and/or bark beetle attacks, so scattered dead trees are visible from the road. Also, due to root disease mortality, stumps (from firewood gatherers) are also visible from the road. Upper slopes of northern aspect within this unit may be visible from the Lake. This unit is currently in partial retention status along the 2642 Road and retention status along the 2642 C Spur and as viewed from the lake.	Many Douglas-fir within the stand will continue to decline and/or die due to root disease and bark beetle attacks. As a result, immediate foreground views along the 2642 Rd and 2642 C spur would continue to be in partial retention status. As root disease centers progress, some of the disease-caused openings might also be visible from the lake.	Thinning with Group Selection openings; Grapple-piled slash Group selection of very dense trees adjacent to the 2642 Road and 2642 C spur may occur to take out root disease infected trees. Selective thinning will occur elsewhere in unit, favoring retention of healthiest, largest trees.	Larch and healthy, large Douglas-fir, with an understory shrub component, would be the primary vegetation focal point following implementation. As a result, the unit would remain in partial retention without any extraneous effort. Casual forest visitors would not be able to discern human activity after a few years of shrub and forb regrowth to help obscure stumps and regreen any openings. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact adjacent to the road. The remainder of the unit would likely remain in retention status, as viewed from the lake and the 2642 Road.
5	Retention	This unit is comprised of an open, dry-site Douglas-fir stand on a rocky outcrop. Grasses and low-growing shrubs make up the understory vegetation component. Some patches of dense, Douglas-fir seedlings/saplings have begun to encroach in this open area. Root disease and drought stress in trees is obvious within this unit. This unit is visible to some residents along the Bottle Bay Road, but travelers on the Bottle Bay Road would not be able to see it. The unit is also visible from a vantage point along the 2642 C spur, and upper portions of the unit may be visible from some locations on Lake Pend Oreille. The unit is currently in retention status because even though the forest stand here is quite open, it blends into the natural rock outcrops.	Encroaching seedlings would continue to grow and go through stem exclusion or natural mortality, as they are denser than this dry microsite can support. Resulting mortalities would create color and/or textural differences, potentially visible from either the 2642 C spur or residential areas along Bottle Bay Road. Otherwise, slowly over time, less and less of the natural opening and rock outcrop would be visible from either the 2642 C spur or the Bottle Bay Road residents. That change would decrease the landscape diversity of patches and could result in decreased scenic integrity.	Special Treatment-Hazardous fuel reduction on rocky outcrops; Broadcast Burn Large, relic Douglas-fir and ponderosa pine will be favored for retention. All other tree ingrowth/ encroachment will be removed. The understory grass/shrub component will be rejuvenated through prescribed burning. The resulting stand will be a park-like forested stand and rock outcrop opening, slightly larger than present, but similar to historic patterns. A schedule of prescribed burning every 10-20 years should be sufficient to maintain this “natural” opening.	Because this unit’s shape and silvicultural prescription were designed to emulate adjacent, natural openings, and to recapture what the area looked like historically, the casual visitor would likely notice very little evidence of human activities. Views from the Bottle Bay Road residential area would remain in retention status, because even though patch size and texture may change, the change would blend with the adjacent landforms. Also, the shape and color would borrow from other openings across the landscape. Obviously, the first 2-5 years after treatment foreground views from the 2642 C spur might be in partial retention status, due to evidence of stumps or prescribed burning adjacent to the road. However, as grasses and shrubs resprout, stumps and charcoal evidence would be obscured. During this “regreening” period, the unit would slowly regain its retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
6	Retention	This unit is comprised of a fairly dense, mixed conifer/hardwood forest stand, including cedar, larch, Douglas-fir, paper birch, red alder, and some white pine. Due to the spatial density of the stand and disease and insect pathogens present, a lot of coarse woody debris has accumulated on the ground. This unit is not visible from the lake due to its north-easterly aspect and relatively low-mid slope location. This unit is currently in retention status from viewing locations--the 2642 and 2642 C roads, as well as some residential areas adjacent to the Bottle Bay Road. Although the unit is currently in retention status, most casual visitors would not be attracted to the "messy" nature of the understory coarse woody debris.	Natural succession and tree mortality would continue to occur, potentially resulting in more woody debris in the understory. In addition, the dense canopies would become denser and potentially create an understory completely devoid (depauperate) of live vegetation, like shrubs or forbs. Likely the retention status of this unit would not change for quite some time, barring a substantial disease/insect outbreak or landscape fire event which could kill the entire stand.	Thinning; Grapple-piled slash All hardwoods, as well as large, healthy cedar, larch, white pine, and some Douglas-fir would be favored for retention. Thinning would primarily be from below and would result in increased spacing between trees.	Following implementation, this unit will remain in retention status from all viewing locations. However, potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the road.
7	Retention	This unit is primarily a dry-site Douglas-fir stand, intermixed with some larch and cedar. The unit is only visible from the 2642 Road. The unit is not visible from the Lake or Bottle Bay Road because a slight rise/ isolated knob exists just north of this unit (within unit 4). Currently the unit is only in a partial retention category, as viewed from the 2642 Road, due to high disease mortality in the overstory and evidence of stumps created by firewood gatherers.	Natural succession and tree mortality would continue to occur, potentially resulting in more woody debris in the understory. Tree mortality, especially adjacent to the 2642 Road, would gradually trend the stand away from partial retention status and could result in modification status.	Thinning with Group-Selection openings; Broadcast Burn	Following implementation, this unit will remain for a time in partial retention category; however, the unit will be more likely to transition to a retention category, as the current ecological succession path the unit is on will not attain retention. By re-introducing better species diversity in this forest stand, the overall, long-term health, vigor and longevity of the stand will be increased. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the 2642 road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
8a	Retention	This unit is partially visible from Bottle Bay and a small portion of the unit is visible from the 2642 Road. The stand has very little tree diversity and is mostly comprised of Douglas-fir, with a minor component of lodgepole pine, ponderosa pine and larch. Mortality and breakage, due to root diesease is gradually worsening and contributing to a significant ground fuel component, and the incidence of Douglas-fir bark beetles has increased substantially recently. The unit is currently within retention status, as viewed from Bottle Bay and the 2642 Road.	As more Douglas-fir die within this Douglas-fir dominated stand, color and textural differences could become evident from the Bottle Bay viewing area (i.e. red-needled trees and dead, no-needle trees.) Fewer standing trees would be visible from the 2642 Road. These changes could result in a shift to partial retention status, as viewed from both the Bottle Bay area and the 2642 Road.	Thinning with Group-Selection openings; Broadcast Burn & Yard Unmerchantable Material (YUM)	The far, northwestern portion of this unit, which is visible from the 2642 Road and will be underburned will likely be in modification category until the burned area begins revegetating. Then, within 1-3 years, it will transition back into a partial retention, then retention status. The remainder of the unit, which is partially visible from Bottle Bay, will remain in retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) within the first 65-150 feet of the 2642 road.
8b	Retention	The northern portion of this unit is visible along the 2642 Road, as foreground views. Most of the unit is visible as far-middleground views from portions of Lake Pend Oreille and Bottle Bay. Either viewshed would consider this unit as currently in retention status.	This unit is undergoing mild mortality and breakage due predominantly to natural succession, drought stress, and some root and stem diseases. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event in the area.	Thinning; Excavator-pile slash in skyline corridors	The light thinning proposed for this unit would have little effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in retention status, as viewed from both the 2642 Road and Lake Pend Oreille. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the 2642 road.
8c	Retention	This unit is primarily a dry-site Douglas-fir stand, intermixed with some larch and understory cedar. Rock outcrops, and associated shrub fields, are interspersed within this unit. The northern portion of this unit is visible along the 2642 Road, as foreground views. Most of the unit, including rock outcrops, is visible as far-middleground views from portions of Lake Pend Oreille and Bottle Bay. Either viewshed would consider this unit as currently in retention status.	No-action alternative would likely result in maintenance of retention status from all viewing locations, barring a landscape fire event. However, as natural succession and mortality (due to root disease and insect infestations) becomes more prevalent, the resulting accumulations of coarse woody debris on the forest floor will likely create a less aesthetic experience for foreground views adjacent to the 2642 Road.	Regeneration harvest/ irregular shelterwood; Broadcast Burn	Foreground views adjacent to 2642 Road will likely view unit as modification status short term, due broadcast burn. Following re-greening, the unit should return to partial retention status (2-5 years), and more slowly to retention status (5-10 years) as new seedlings grow. From middleground views (on Lake Pend Oreille) the unit will be able to maintain a partial retention or retention status if unit is successfully melded into existing landscape character. By blending the shape and size of new, irregular shelterwood harvest openings, harvest units would blend into and/or emulate natural openings as viewed from middle-ground/background views. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and leaving small clumps of trees within the 65-150 feet of the 2642 road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
8d	Retention	The northern portion of this unit is visible along the 2642 Road, as foreground views. Most of the unit is visible as far-middleground views from portions of Lake Pend Oreille and Bottle Bay. Either viewshed would consider this unit as currently in retention status.	This unit is undergoing mild mortality and breakage due predominantly to natural succession, drought stress, and some root and stem diseases. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event in the area.	Thinning; Excavator-pile slash in skyline corridors	The light thinning proposed for this unit would have little effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in retention status, as viewed from both the 2642 Road and Lake Pend Oreille. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and leaving small clumps of trees within the first 65-150 feet of the 2642 road.
9	Retention	This unit is comprised of a fairly dense, mixed conifer/hardwood forest stand, including cedar, larch, Douglas-fir, paper birch, black cottonwood, red alder, and some white pine. Due to the spatial density of the stand and forest pathogens present, a lot of coarse woody debris has accumulated on the ground.The southern portion of this unit is visible along the 2642 Road, as foreground views. Portions of the unit are visible as far-middleground views from portions of Lake Pend Oreille and Bottle Bay. Either viewshed would currently classify this unit in retention status.	This unit is undergoing mild mortality and breakage due predominantly to natural succession, drought stress, and some root and stem diseases. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event in the area.	Thinning; No slash treatment is necessary, but portions of the unit may be YUM'd.	The light thinning proposed for this unit would have little effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in retention status, as viewed from both the 2642 Road and Lake Pend Oreille. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the 2642 road.
10	Retention	This unit is primarily a fairly open, dry-site Douglas-fir stand, intermixed with some ponderosa pine and larch. Rock outcrops and shrub ecotones are also scattered throughout the unit. Due to extensive drought stress, insect attacks, and root disease in the Douglas-fir, many trees are dead or have fallen over. As a result, in some areas coarse woody debris accumulations on the ground are dense. Currently, this stand would be classified as retention or partial retention from both visible components adjacent to the 2642 Road, as well as viewshed from Lake Pend Oreille.	No-action alternative would likely result in maintenance of retention status from all viewing locations, barring a landscape fire event. However, as natural succession and mortality (due to root disease and insect infestations) becomes more prevalent, the resulting accumulations of coarse woody debris on the forest floor will likely create a less aesthetic experience for foreground views adjacent to the 2642 Road. In addition, views from the lake could change texturally, in color, or in shape/size of openings as more trees die.	Regeneration harvest/ irregular shelterwood; Broadcast Burn Healthy western larch, ponderosa pine, and large, relic Douglas-fir will be favored for retention.	This unit's shape and silvicultural treatment were designed to emulate adjacent, natural openings; therefore, casual visitors would likely notice little evidence of human activities. Views from Lake Pend Oreille would remain in retention status. Even though patch size, texture, shape and color may change, the change would blend with the adjacent landforms. The first 2-5 years after treatment foreground views adjacent to 2642 Road might be in partial retention status, due to evidence of stumps or prescribed burning. However, as grasses/shrubs resprout, stumps and charcoal evidence would be obscured. During this period, the unit would slowly regain its retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") and leaving small clumps of trees within 65-150 feet of the road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
11	Retention	Unit 11 is a fairly dense, mixed conifer stand on a fairly moist site. Predominant species include cedar, Douglas-fir, larch, and hemlock. This unit is not visible from the Bottle Bay Road or any portion of Lake Pend Oreille due to its mid- to upper slope and southeastern aspect within the Gold Gulch drainage. This unit is adjacent to Gold Hill Trail No. 2 (motorized trail), and the 2642 Road and is therefore classified as foreground views to those areas. Unit 11 is currently within retention status from these viewsheds.	Some portions of the unit are extremely dense and root disease is present, which will continue to result in tree mortality and windthrow. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event in the area. However, adjacent to roads and trails where tree mortality results in increased woody debris accumulation on the ground, most visitors will not view the unit as aesthetically pleasing.	Thinning; Grapple-piled slash Healthy western larch, Douglas-fir, ponderosa pine, white pine and larger cedar will be favored for retention.	The light thinning proposed for this unit would have little negative effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in retention status, as viewed from both the 2642 Road and Trail No. 2. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") and leaving small clumps of trees within 65-150 feet of the road and within 75 feet of trail center. No tree-marking paint should be visible from the trail system.
12a	Retention	This stand is comprised of approx. 80-year old Douglas-fir, with a few scattered larch, ponderosa pine, and cedar. The understory is quite open, since the trees reached closed-canopy stage some time ago. This unit is not visible from the Bottle Bay Road or any portion of Lake Pend Oreille due to its mid- to upper slope and southeastern aspect within the Gold Gulch drainage. However, portions of the stand are visible, as foreground views, from the 2642 Road. Unit 12a is currently in retention status as viewed from the 2642 Road.	Some root disease is present within this stand, and will continue to result in mortality and windthrow of individual trees. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event in the area. However, adjacent to roads where tree mortality results in increased woody debris accumulation on the ground, most visitors will not view the unit as aesthetically pleasing.	Thinning with Group-Selection openings; Broadcast Burn	The thinning and group selection harvests proposed for this unit will have little effect on visual characteristics. Tree stocking will still be sufficient to exhibit "forest characteristics" to visitors. However, slash treatment proposed is broadcast burning, which will, temporarily at least, put the unit in modification or partial retention status. After 2-5 years, shrubs and grasses will have resprouted sufficiently to regain retention status. Such "regreening" will also obscure views of stumps adjacent to the road. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") within 65-150 feet of the road.
12b	Retention	The forest stand is similar to 12a in species composition and density, but mortality caused by root disease and insect attacks is prevalent. This unit is located on a bench or natural terrace immediately adjacent to a private boundary (along the unit's eastern boundary.) The private property was seed-tree harvested several years ago, and as a result the textural difference is an obvious line along the property boundary. Portions of this unit are visible as middle-ground views from the Bottle Bay Road area and from the southern tip of Bottle Bay. The unit is currently within retention status from both views.	No-action alternative would likely result in maintenance of retention status from all viewing locations, barring a landscape fire event. However, as natural succession and mortality (due to root disease and insect infestations) becomes more prevalent, the resulting views from the Bottle Bay or Bottle Bay Road could change texturally, in color, or in shape/size of openings as more trees die.	Thinning with Group-Selection openings; Grapple-piled slash The largest and healthiest larch, ponderosa pine, and some Douglas-fir will be favored for retention.	Because this unit's position is on a natural terrace and the planned action is a thinning with group selection openings in the root disease epicenters, the project will have no negative effect on visual characteristics. In fact, the treatment will likely soften the "sharp" , defined line people can pick out along the NFS/ private property boundary, when viewed from either Bottle Bay or the Bottle Bay Road area. The unit will remain in retention status following project implementation.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
14	Retention	This unit is a very dry site, open stand of predominantly Douglas-fir, with some larch and cedar in places. There are numerous shrub fields and rock outcrops within and adjacent to the stand, due primarily to the concentration of root disease in the stand. The upper slopes within the unit are visible from numerous points on Lake Pend Oreille as middleground views. Only the upper-most slope is visible from the 2642 Road as foreground views (due to extreme steepness.) Currently, the unit is only within partial retention status, due to the substantial tree mortality and recent color/texture changes.	Under the no-action alternative, during the next 10-20 years, the forest stand would continue to deteriorate due to drought stress, lack of species diversity, as well as insect attacks and root disease. Barring a landscape fire event, the stand would further decline to potentially even a modification status.	Regeneration harvest/ irregular shelterwood; Broadcast Burn	This unit's planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture; therefore, casual visitors would likely notice little evidence of human activities. Views from Lake Pend Oreille would remain in partial retention status. Even though patch size, texture, shape and color may change, the change would blend with the adjacent landforms. Eventually, this treatment will allow the stand to reach retention status due to increased diversity and vigor. The first 2-5 years after treatment foreground views adjacent to 2642 Road might be in modification status, due to evidence of stumps, skyline harvest, or prescribed burning. However, as grasses/shrubs resprout, stumps and charcoal evidence would be obscured. During this period, the unit would slowly regain its partial retention status. As new tree seedlings grow, retention status could even be attained. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") within 65-150 feet of the road.
15	Retention	The forest stand is similar to 12a in species composition and density, but mortality caused by root disease and insect attacks is prevalent. This unit is located on a bench or natural terrace immediately adjacent to a private boundary (along the unit's eastern boundary.) The private property was seed-tree harvested several years ago, and as a result the textural difference is an obvious line along the property boundary. Portions of this unit are visible as middle-ground views from the Bottle Bay Road area and from the southern tip of Bottle Bay. The unit is currently within retention status from both views.	No-action alternative would likely result in maintenance of retention status from all viewing locations, barring a landscape fire event. However, as natural succession and mortality (due to root disease and insect infestations) becomes more prevalent, the resulting views from the Bottle Bay or Bottle Bay Road could change texturally, in color, or in shape/size of openings as more trees die.	Thinning with Group-Selection openings; Broadcast Burn The largest and healthiest larch, ponderosa pine, and some Douglas-fir will be favored for retention.	Because this unit's position is on a natural terrace and the planned action is a thinning with group selection openings in the root disease epicenters, the project will have no negative effect on visual characteristics. In fact, the treatment will likely soften the "sharp", defined line which is visible along the NFS/ private property boundary, when viewed from either Bottle Bay or the Bottle Bay Road area. The unit will remain in retention status following project implementation.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
16	Retention	This is a fairly young (40-70 years old), dry site stand of mixed conifers. Stand is located on a narrow, natural terrace adjacent to the 2642 Road, and Douglas-fir is over-represented. Root disease is prevalent in the stand. Due to maturity and height of stands just downslope from 2642 Road (including unit 14), most of this unit is not visible from Lake Pend Oreille. However, the entire unit would be visible as foreground from points along the 2642 Road. Currently, the unit is in retention status, but is transitioning to partial retention status as firewood gatherers have created numerous, visible stumps adjacent to the road.	Under the no-action alternative, during the next 10-20 years, this unit would likely retain retention status, barring a landscape fire event. However, as natural succession, mortality (due to root disease and insect infestations), and firewood gathering becomes more prevalent, the resulting foreground views from the 2642 Road would trend towards partial retention status.	Thinning; Grapple-piled slash Daylight around healthy larch. Favor retention of full-crowned, healthy larch and ponderosa pine, and to a lesser extent the larger, healthy Douglas-fir.	The light thinning proposed for this unit would have little negative effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in retention status, from all viewing locations. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches), varying basal pruning heights, and leaving small, irregular-shaped clumps of trees intact within 65-150 feet of the 2642 Road.
17	Retention	This unit is primarily a dry-site Douglas-fir stand, intermixed with some larch, ponderosa pine, rocky mountain maple, and cedar. Rock outcrops are interspersed throughout the stand, and root disease is prevalent. A large portion of the unit is visible from Lake Pend Oreille as middleground views. Currently the unit is within retention status.	Under the no-action alternative, during the next 10-20 years, natural succession and tree mortality would continue to occur. This mortality could potentially result in more woody debris accumulations in the understory, as well as color and textural changes which could be visible from the Lake. However, the unit would likely remain in retention status for the next 10-20 years, barring a landscape level fire event.	Thinning with Group-Selection openings; Broadcast Burn The largest and healthiest larch, ponderosa pine, hardwoods, and some Douglas-fir will be favored for retention.	Group selection openings should be created so as to emulate natural openings, especially those adjacent to rock outcrops. The overall thinning of the stand will have very little negative effect on the visual characteristics. The planned broadcast burning of slash would not affect the middleground views from the lake, except during the actual burning operation. Following implementation of this project and completion of slash disposal, this stand will remain in retention status. In fact, thinning the stand should enhance the growth, vigor, health and longevity of the remnant stand, which positively influences the visual qualities.
18	Retention	Unit 18 is a fairly dense, mixed conifer stand on a fairly moist site. Predominant species include cedar, Douglas-fir, larch, lodgepole pine, and hemlock. Rock out-crops are interspersed throughout the stand. The upper slope of the unit is within foreground view of the 2642 Road. Much of the stand is visible from various viewpoints on Lake Pend Oreille. However, due to significant root disease and bark beetle mortality, the unit is currently only in partial retention status.	Some portions of the unit are extremely dense and root disease is abundant, which will continue to result in tree mortality and windthrow. During the next 10-20 years under the no-action alternative, the stand would likely remain in partial retention status, barring a landscape-level fire event in the area. However, adjacent to roads where tree mortality results in increased woody debris accumulation on the ground, most visitors will not view the unit as aesthetically pleasing.	Thinning with Group-Selection openings; Grapple-piled slash The largest and healthiest larch, ponderosa pine, cedar and some Douglas-fir will be favored for retention.	The thinning and group selection harvest proposed for this unit would have little negative effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in partial retention status, as viewed from both the 2642 Road and Lake Pend Oreille. Slowly, as growth, vigor, health and longevity of the remnant stand improves, the stand should slowly trend toward retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6”) and leaving small clumps of trees within 65-150 feet of the road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
19	Retention	Unit 19 is comprised of mixed conifers, including larch, ponderosa pine, Douglas-fir, lodgepole pine, as well as scattered cedar associated with deeper soils. This unit is visible as foreground views from the 2642 Road, and portions of the unit are visible as far-middleground views from Lake Pend Oreille, Sandpoint, and Hwy. 95. Previous harvest activities have occurred in this unit and firewood gathering is also common, so the unit is in partial retention status as viewed from the 2642 Road. As viewed from Lake Pend Oreille, Sandpoint, and Hwy. 95, the unit is in retention status.	Root disease is abundant in the Douglas-fir, and dwarf mistletoe is prevalent in the larch within the stand. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event.	Thinning with Group-Selection openings; Grapple-piled slash The largest and healthiest larch, ponderosa pine, cedar and some Douglas-fir will be favored for retention.	Following implementation of this project and completion of slash disposal, this stand will either be in retention status or the low-end of partial retention status. However, thinning the stand should enhance the growth, vigor, health and longevity of the remnant stand. As a result, if the stand ends up in partial retention, it will transition back into retention status relatively quickly. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") and leaving small clumps of trees within 65-150 feet of the road.
20	Retention	This unit is primarily a dry-site Douglas-fir stand, intermixed with some larch, ponderosa pine, rocky mountain maple, and cedar. Rock outcrops are interspersed throughout the stand, and root disease is prevalent. Most of the unit is visible from Lake Pend Oreille and Sandpoint area as middleground views. Currently the unit is within retention status.	Many Douglas-fir within the stand will continue to decline and/or die due to root disease and bark beetle attacks. As root disease centers progress, some of the disease-caused openings might also be visible from the lake. During the next 10-20 years under the no-action alternative, the stand would likely remain in retention status, barring a landscape-level fire event.	Regeneration harvest/ irregular shelterwood; Broadcast Burn	For the first few years after harvest, most of this stand would probably be categorized as partial retention, transitioning back to retention as understory vegetation growth camouflages stumps and regeneration has a growth flush. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) adjacent to 2642 Rd and mimicking adjacent patch sizes/shapes for harvest unit. The largest, healthiest, and most disease/ insect resistant trees will be favored for retention. The edges of this unit should be developed, so as to blend into unit 25. If not completed, the unit boundary could appear abrupt and obvious from vantage points along Highway 95 and in Sandpoint.
21	Retention	The stand is comprised of larch and hardwood species, with lesser amounts of cedar and Douglas-fir. Stem and root disease are present in the stand. The top end of the Gold Hill Trail No. 3 dissects the unit, and the upper trailhead for Trail No. 3 is located near the southeastern corner of the unit. Due to the unit's position on a terrace, the unit is only visible as foreground views from Gold Hill Trail No. 3 and the 2642 Road. The unit is currently within retention status from these viewing locations.	Under the no-action alternative, during the next 10-20 years, this unit would likely retain retention status, barring a landscape fire event.	Thinning; Grapple-piled slash Daylight around healthy larch. Favor retention of full-crowned, healthy larch, ponderosa pine, hardwoods, and to a lesser extent the larger, healthy Douglas-fir.	The light thinning proposed for this unit would have little negative effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in retention status, as viewed from both the 2642 Road and Trail No. 3. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") and leaving small clumps of trees or tall shrubs within 65-150 feet of the road and within 75 feet of trail center. No tree-marking paint should be visible from the trail system.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
22	Retention	Unit 22 is comprised of mixed conifers, including larch, ponderosa pine, Douglas-fir, lodgepole pine, as well as scattered cedar associated with deeper soils. This unit is visible as foreground views from the 2642 Road, and portions of the unit are visible as far-middleground views from Lake Pend Oreille and Sandpoint. Previous harvest activities have occurred in this unit and firewood gathering is also common, so the unit is in partial retention status as viewed from the 2642 Road. As viewed from Lake Pend Oreille and Sandpoint, the unit is in retention status.	Root disease is abundant in the Douglas-fir, dwarf mistletoe is prevalent in the larch within the stand, and many of the cedar are exhibiting sunscald damage. During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. As a result, the unit would likely remain in retention status as viewed from Lake Pend Oreille and Sandpoint, and from the 2642 Road, the unit would remain in partial retention status.	Thinning with Group-Selection openings; Grapple-piled slash The largest and healthiest larch, ponderosa pine, cedar and some Douglas-fir will be favored for retention.	Following implementation of this project and completion of slash disposal, this stand will either be in partial retention status. However, thinning the stand and removing disease-infected trees should enhance the growth, vigor, health and longevity of the remnant stand. As a result, the stand should transition back into retention status relatively quickly. Potential detrimental effects could be minimized by requiring low stump heights (less than 6”) and leaving small clumps of trees within 65-150 feet of the road.
23	Retention	This is a two-storied stand comprised predominantly of hemlock, grand fir, larch, white pine, cedar, and lodgepole pine. This stand was shelterwood harvested in 1995. Large hemlock, grand fir, cedar, and Douglas-fir were left in the overstory as initial shelter for the new forest stand. Preferred, disease-resistant tree seedlings were planted, and natural regeneration also occurred. Both natural regen and planted stock are now a healthy forest stand of dense saplings, mostly comprised of larch, white pine, cedar, grand fir, and lodgepole pine. This unit is visible from portions of Lake Pend Oreille as middleground views, and from 2642 Road as foreground views. From both perspectives, the unit is still in partial retention status, but is trending towards retention status.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes and growth of the younger trees. As a result, the unit would likely convert to retention status sometime within the next ten years.	Overstory Removal of past harvest unit; Precommercially Thin primary stand of natural and planted tree saplings; Hand Pile Slash adjacent to 2642 Road	Following implementation of this project and completion of slash disposal, this stand should be in partial retention status from both viewsheds. However, thinning the primary stand of saplings should enhance the growth, vigor, health and longevity of the remnant stand. As a result, the stand should trend back to retention status quite quickly. Potential detrimental effects could be minimized by requiring low stump heights (less than 6”) and leaving small clumps of trees within 65-150 feet of the road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
25	Retention	This unit is a dry, steep, fairly open stand of Douglas-fir and ponderosa pine, with pockets of cedar and larch associated with deeper soils. Rock outcrops are interspersed throughout the stand. This unit is visible as foreground views from Gold Hill Trail No. 3, and portions of the unit are visible as far-middleground views from Lake Pend Oreille, Hwy 95, and Sandpoint. The unit's openness and tree mortality would lend towards partial retention status, but the stand openings are natural, so the unit is within retention status.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. Tree mortality caused by drought stress and root disease would also continue. As a result, the unit would likely remain in retention status as viewed from Lake Pend Oreille, Hwy. 95, and Sandpoint. However, as more trees die, the unit may trend towards partial retention status as viewed from the Gold Hill Trail No. 3.	Regeneration harvest/ irregular shelterwood; YUM	This unit's planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture, as well as to blend into unit 20; therefore, casual visitors would likely notice little evidence of human activities. Views from Lake Pend Oreille and Sandpoint would remain in retention status. The first 2-5 years after treatment foreground views adjacent to Gold Hill Trail No. 3 might be in partial retention status. However, as grasses/ shrubs resprout, stumps and other evidence would be obscured. As such, the unit would slowly regain its retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") and no visible tree paint within 75 feet of the trail.
26	Retention	This is a fairly dense, multi-storied stand that includes predominantly Douglas-fir, grand fir, larch, and cedar. Rock outcrops are interspersed throughout the stand. Portions of this unit are visible from Gold Hill Trail No. 3 and Bottle Bay Road as foreground views. In additon, portions of the unit are visible from Lake Pend Oreille as middleground views. Root disease is prevalent, and dead/dying trees are obvious from the Bottle Bay Road. Currently the lower portion of the unit viewed from Bottle Bay Rd. is in partial retention status; retention status as viewed from the Lake.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. Tree mortality caused by root disease would also continue. As a result, the unit would likely remain in retention status as viewed from Lake Pend Oreille, and partial retention status as viewed from Bottle Bay Road and the Gold Hill Trail.	Regeneration harvest/ irregular shelterwood; Slash to be treated in a combination of YUM'ing and Broadcast Burning	This unit's planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture; therefore, casual visitors/viewers would likely notice little evidence of human activities. The first 2-5 years after treatment foreground views adjacent to Bottle Bay Road and middleground views from Lake Pend Oreille may be in modification or partial retention status, due to evidence of stumps or prescribed burning. However, as grasses/shrubs resprout, stumps and charcoal evidence would be obscured. During this period, the unit would slowly regain its retention status. No tree-marking paint should be visible from the road or trail system upon completion of project.
27	Retention	The stand is comprised of Douglas-fir, hardwood species, and larch, with lesser amounts of cedar. Although trees are fairly open-spaced, crown closure is approaching 85%. Lots of stem and root decay is present, and Douglas-fir appear to be dying at a rate of about 2-5% per year. Rock outcrops are interspersed throughout the stand. Portions of the unit are visible as middleground views from Lake Pend Oreille, especially upperslope and convex slopes in the stand. Currently unit is within retention status.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. Tree mortality caused by root disease would also continue. As a result, the unit would likely remain in retention status as viewed from Lake Pend Oreille, but, as more trees die, the unit may trend towards partial retention status.	Regeneration harvest/ irregular shelterwood; Broadcast Burning	This unit's planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture; therefore, casual visitors/viewers would likely notice little evidence of human activities. The first 2-5 years after treatment foreground views adjacent to Bottle Bay Road and middleground views from Lake Pend Oreille may be in modification or partial retention status, due to evidence of stumps or prescribed burning. However, as grasses/shrubs resprout, stumps and charcoal evidence would be obscured. During this period, the unit would slowly regain its retention status.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
28	Retention	This unit is a dry, steep, fairly open stand of Douglas-fir and ponderosa pine, with pockets of cedar and larch associated with deeper soils. Rock outcrops are interspersed throughout the stand. This unit is visible as foreground views from portions of the Bottle Bay Road and as middleground views from Lake Pend Oreille, Hwy 95, and Sandpoint. The unit's openness and tree mortality would lend towards partial retention status, but the stand openings are natural, so the unit is within retention status.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. Tree mortality caused by drought stress and root disease would also continue. As a result, the unit would likely remain in retention status as viewed from Lake Pend Oreille, Hwy. 95, Sandpoint, and Bottle Bay Road, but as more trees die, the unit may trend towards partial retention status.	Regeneration harvest/ irregular shelterwood; YUM	This unit's planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture; therefore, casual visitors/viewers would likely notice little evidence of human activities. Views from Lake Pend Oreille and Sandpoint would remain in retention status. The first 2-5 years after treatment foreground views adjacent to Bottle Bay Road might be in partial retention status, due to evidence of stumps or slash. However, as grasses/shrubs resprout, stumps and other evidence would be obscured. During this period, the unit would slowly regain its retention status.
29	Retention	The eastern portion of this unit is visible along the 2642 Road, as far-foreground views. Some past harvest activity is visible adjacent to road, and as such is in partial retention status as viewed from the road. Only the upper slope of the unit is visible as far-middleground views from portions of Bottle Bay. From this view-shed, the unit is in retention status.	This unit is undergoing mild mortality and breakage due predominantly to natural succession, drought stress, and some root and stem diseases. During the next 10-20 years under the no-action alternative, the stand would likely remain in current visual status, barring a landscape-level fire event in the area.	Thinning; Excavator-pile slash in skyline corridors	The light thinning proposed for this unit would have little effect on visual characteristics. Therefore, if certain mitigation measures are implemented, the proposed action would result in the unit remaining in its current visual status, as viewed from both the 2642 Road and Bottle Bay. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) and identifying/leaving small, irregular-shaped clumps of trees intact within the first 65-150 feet of the 2642 road.
30	Retention	This unit is a dry, steep, fairly open stand of Douglas-fir, with pockets of cedar and larch associated with deeper soils. Rock outcrops are interspersed throughout the stand. This unit is visible as foreground views from 2642 Road, and portions of the unit are visible as far-middleground views from Lake Pend Oreille. Currently the unit is within retention status from both viewsheds.	Under the no-action alternative, during the next 10-20 years, the forest stand would continue to deteriorate due to drought stress, lack of species diversity, as well as insect attacks and root disease. Barring a landscape fire event, the stand would further decline to potentially even a partial retention or modification status.	Regeneration harvest/ irregular shelterwood; Broadcast Burning	This unit's planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture; therefore, casual visitors would likely notice little evidence of human activities. Views from Lake Pend Oreille would remain in retention status, as the unit will simply look like an expanded version of the rock outcrops which dominate the stand. The first 2-5 years after treatment foreground views adjacent to 2642 Road might be in partial retention status, due to evidence of stumps, skyline harvest, or prescribed burning. However, as grasses/shrubs resprout, stumps and charcoal evidence would be obscured. During this period, the unit would slowly regain its retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6") within 65-150 feet of the road.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
31	Retention	This unit is located on a natural upland terrace and is comprised predominantly of fairly young (40-80 year old) Douglas-fir, larch, and lodgepole pine. Some cedar and ponderosa pine are also present in certain areas within the unit. Portions of the upper slopes within the unit may be visible as far-middleground views from Bottle Bay or the eastern end of Lake Pend Oreille. From either viewshed, the unit is currently classified as meeting retention status.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. The unit would likely remain in retention status as viewed from Lake Pend Oreille and Bottle Bay.	Thinning; Grapple-piled slash Daylight around healthy larch. Favor retention of full-crowned, healthy larch, cedar, hardwoods, and to a lesser extent the larger, healthy Douglas-fir.	The light thinning proposed for this unit would have little negative effect on visual characteristics. Therefore, the proposed action would result in the unit remaining in retention status, as viewed from both Lake Pend Oreille and Bottle Bay.
32	Retention	This unit is an extremely dense forest stand on a fairly moist site and is located adjacent to Gold Hill Trail No. 3. The stand is comprised of cedar, grand fir, larch, hemlock, and Douglas-fir. Stem and root diseases are prevalent, and bark beetle activity is common, especially related to windthrown slash. This unit is visible as immediate foreground views from the trail, and portions of the stand are visible as middleground views from Lake Pend Oreille. Due to the need to keep the trail open, trees have frequently been sawn out of the trail and left as slash adjacent to the trail. As a result, the unit is currently only in modification status as viewed from the trail itself. However, human activities are not obvious from afar, and as such views from Lake Pend Oreille are in retention status.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. The unit would likely remain in retention status as viewed from Lake Pend Oreille and Bottle Bay, and would remain in modification status as viewed from the trail.	Hand Thinning; Hand-piled Slash Focus on removing the ground fuel hazard caused by the accumulated, down woody debris. Perform some basal pruning of trees adjacent to the trail where necessary. Slash and pile sub-merchantable, suppressed trees, which would likely contribute to future ground fuels accumulations.	The light thinning and slash clean-up work proposed for this unit would have little negative effect on visual characteristics. Therefore, the proposed action would result in the unit remaining in retention status as viewed from Lake Pend Oreille. In addition, the proposed action would likely immediately convert/ improve the foreground views from Gold Hill Trail No. 3 to partial retention or retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6”) within 75 feet of the trail, and any stumps should be flush-cut. In addition, upon completion of this project, no tree-marking paint should be visible from the trail system.

Unit	VQO	Existing Condition	No-Action Alternative (Alt. A) Effects	Proposed Action (Alt. B)	Proposed Action (Alt. B) Effects
33	Retention	This unit is comprised of an open, dry-site Douglas-fir and ponderosa pine stand on a rocky outcrop. Grasses and low-growing shrubs make up the understory vegetation component. Some patches of dense, Douglas-fir seedlings/saplings have begun to encroach in this open area. Root disease and drought stress in trees is obvious within this unit. This unit is visible from some locations on Lake Pend Oreille and Sandpoint as far-middleground views. The unit is also visible as foreground views and an undeveloped vista point along the 2642 Road. The unit is currently in retention status because even though the forest stand here is quite open, it blends into the natural rock outcrops.	Encroaching seedlings would continue to grow and go through stem exclusion or natural mortality, as they are denser than this dry microsite can support. Resulting mortalities would create color and/or textural differences, potentially visible from Lake Pend Oreille and Sandpoint. Otherwise, slowly over time, less and less of the natural opening and rock outcrop would be visible. That change would decrease the landscape diversity of patches and could result in decreased scenic integrity.	Special Treatment-Hazardous fuel reduction on rocky outcrops; Broadcast Burn Large, relic Douglas-fir and ponderosa pine will be favored for retention. All other tree encroachment will be removed. The understory grass/shrub component will be rejuvenated through prescribed burning. The resulting stand will be a park-like forested stand and rock outcrop opening, slightly larger than present, but similar to historic patterns. A schedule of prescribed burning every 10-20 years should be sufficient to maintain this “natural” opening.	For 2-5 years immediately following project implementation this unit may be in modification or partial retention status due to evidence of stumps, charcoal, and helicopter landing activities. However, as grasses and shrubs resprout over time, stumps and charcoal evidence would be obscured. Because this unit’s shape and silvicultural prescription were designed to emulate adjacent, natural openings, and to recapture what the area looked like historically, the casual visitor would likely notice very little evidence of human activities. Views from the Sandpoint area and Lake Pend Oreille would slowly regain retention status. Potential detrimental effects could be minimized by requiring low stump heights (less than 6 inches) within the first 65-150 feet of the 2642 Road.
34	Retention	The stand is comprised of Douglas-fir, hardwood species, and larch, with lesser amounts of cedar. Although trees are fairly open-spaced, crown closure is approaching 85%. Lots of stem and root decay is present, and Douglas-fir appear to be dying at a rate of about 5% per year. Portions of the unit are visible as foreground views from the Bottle Bay Road. From this area, the unit is currently classified as retention status. Due to the units’ location on a natural terrace and its mid-slope, northeastern aspect, the unit is not visible from Bottle Bay or Lake Pend Oreille.	During the next 10-20 years under the no-action alternative and barring a landscape-level fire event, the stand would continue with natural succession processes. Tree mortality caused by drought stress and root disease would also continue. As a result, the unit would likely remain in retention status as viewed from Bottle Bay Road, but as more trees die, the unit may trend towards partial retention status.	Regeneration harvest/ irregular shelterwood; Grapple-piled slash Healthy larch will be daylighted to improve health and longevity. Cedar and large, healthy Douglas-fir will also be favored for retention.	This unit’s planned shelterwood harvest openings were designed to emulate adjacent, natural openings in shape and texture. The first 2-5 years after treatment foreground views adjacent to Bottle Bay Road may be in modification or partial retention status, due to evidence of stumps or temporary road construction. However, after the temporary road is decommissioned and grasses/shrubs resprout, stumps and other evidence would be obscured. During this period, the unit would slowly regain visual integrity. As newly planted tree seedlings and natural tree regeneration perpetuate and grow, the new stand will regain full retention status, probably within 10-15 years. With increased species diversity of the new stand, the future stand should be healthy and vigorous for many decades to come.

Overall, the treatments would modify the immediate view. However, by retaining the variation in tree heights and sizes, as well as spacing and clumping the residual trees in an irregular fashion, unnaturally appearing features would be reduced and the treatments would blend into the surrounding landscape. Unit shape, sizes, and spatial arrangement will mimic adjacent natural openings and geologic features. In other words, the form, line, color and texture of the immediate landscape would be modified, but the form, line, color and texture of the surrounding landscape would be borrowed from and retained across the entire viewing area. The activities may be evident and the landscape character may appear slightly altered, but treatments would remain subordinate to the characteristic landscape. For some units, the retention VQO would be hard to meet even at present because of the past treatments and naturally occurring events. Human activities are already evident, and insect and disease related mortality has changed the landscape character. With this in mind, the proposed treatments would not degrade the existing landscape character. In these areas, shaping and blending treatments with natural vegetation patterns and geologic features currently present would attain a high degree of visual quality (see photos in the visuals section of the project file).

Consistency with the Forest Plan and Other Regulatory Direction

The proposed action would meet National Forest Management Act (NFMA) and The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) requirements. An assessment of potential aesthetic impacts has been made and given appropriate consideration. Treatment areas would be shaped and blended to the extent practicable with the natural terrain. Forest Service Manual direction and Regional Visual Quality issuances pertaining to scenery management would be met. The assessment of potential impacts has incorporated all points pertaining to scenery analysis as outlined in the Forest Service Manual. Photos of the visually sensitive units have been taken and used to analyze the potential visual effects of project activities. All Forest Plan Standards would be met. Established VQOs would be met except in areas where the mortality rate for timber is very high or where past management practices make it impractical. In these areas, shaping and blending treatments with natural vegetation patterns and geologic features currently present would attain a high degree of visual diversity and quality. In addition, the other design features and mitigation measures specified for visuals would minimize the potential detrimental effects to the scenic resource.

Heritage Resources

Documentation required to protect heritage resources is located in the project file, and sensitive information is on-file in the Forest Supervisor’s Office and with the District Archaeologist. Tribal consultation pertaining to the project is in process, and concurrence is pending from the State Historic Preservation Office (SHPO).

Affected Environment

The project area was initially surveyed for heritage/archaeological resources in 1994 related to the 1995 Gold Hill Timber Sale (see project file.) A review of previous surveys was performed in 2007. Two heritage sites within the project area were recorded in 1994 and were determined to

be the result of early twentieth century prospecting and small-scale logging operations (probably specialty products logging.) In addition, during project development and design, the project leader and District Archaeologist investigated an area with potential evidence of pit-mound prospecting in the project area. However, after further evaluation, the Archaeologist determined the soil displacement to be the result of a historic wind event, which uprooted hundreds of trees in a 20-acre area, resulting in pit-mound topographical features (similar to what prospecting would create.) No additional heritage sites have recently been identified.

Environmental Consequences

Design features were developed as part of the proposed project which will protect known heritage sites and ensure protection of previously undiscovered sites. No heritage issues or conflicts with the proposed project have been identified. Therefore, both the no-action and proposed-action alternatives analyzed for this project would result in no negative direct or indirect effects to heritage resources.

List of Preparers

This section includes a list of preparers of the environmental document or supporting reports, as well as those responsible for developing the project proposal and reviewing the environmental analysis.

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Agencies and Organizations Consulted

Federal, State, Tribal, and Local Agencies

- US Fish and Wildlife Service (USFWS)
- Idaho Department of Parks and Recreation
- Idaho Department of Fish and Game
- Idaho Department of Lands
- Kalispel Tribe of Indians
- Coeur d'Alene Tribe
- Bonner County WUI Fire Mitigation Planning Committee (BonFIRE)
- Sagle Fire District

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Appendix A: Proposed Action Design Features and Mitigation Measures

Features Designed to Protect Fisheries

The following design criteria focus on adequate protection of aquatic resources by following the Standards and Guides in the Inland Native Fish Strategy (INFS- USDA Forest Service 1995) amendment to 1987 IPNF Forest Plan (USDA Forest Service 1987). Estimated Effectiveness of the measures is provided in the parent document unless otherwise noted below (see project file).

1. Prohibit timber harvest within any RHCA, regardless of fish-bearing potential. Verify proper Riparian Habitat Conservation Area designations have been set. Appropriate RHCA categories shall be verified by a qualified field biologist or hydrologist during unit layout and if needed shall be adjusted conservatively to provided adequate resource protection. The minimum RHCA widths are 300 ft for fish-bearing streams, 150 ft for perennial non-fish bearing streams, and 60 ft (one-half the site potential tree height) for seasonal streams for this project.

Estimated Effectiveness: high; this is required by the current Forest Plan and BMP 15.19.

2. For existing and planned roads, meet Riparian Management Objectives (RMOs) and avoid adverse impacts to inland native fish by minimizing roads and landings in RHCAs, implement road management that addresses regulation of traffic during wet periods, avoid sediment delivery to streams from the road surface, and avoid disruption of natural hydrologic flow paths (INFS Road Standards - USDA Forest Service 1995).

   The following site specific Best Management Practices are targeted at reducing impacts from roads and efficacy of each measure is provided in the Programmatic Road Maintenance Biological Assessment (USDA Forest Service 2004) and the Forest Service Soil and Water Conservation Handbook (USDA Forest Service 1988).

   a. Locate fuel storage areas outside of RHCAs and provide facilities to contain the largest possible spill. Leaks of motor oil and hydraulic fluids from heavy equipment should be monitored and controlled to prevent water contamination. (BMP 11.07, 11.01, 15.11)

   b. When conducting surface blading and surface replacement utilize natural moisture or delivered water in blading operations to ensure rapid consolidation and compaction of the disturbed surface material. (BMP 15.18)

   c. When conducting surface blading and surface replacement remove and re-incorporate material from the outside edges of the roadway that may result in the formation of a berm or other barrier to proper dispersal of water. (BMP 15.18)

   d. DO NOT side cast waste fill material within RHCAs, waste material must be end hauled to an appropriate disposal location. Outside of RHCAs, side casting of minor amounts of material, such as oversize rock, may occur if no other practical solution

exists. In no instance should side cast material be placed in a manner that results in oversteepened fill slopes, additional road width or impede proper drainage. (BMP 15.18)

e. On site disposal of material may be appropriate if the material can be incorporated into the road surface or drainage structure. Do not dispose of material within RHCA, floodplain or other wetlands. (BMP 13.03, 15.18)

f. Cleaning of ditch relief culverts on cross drain structures such as open top culvert will not be done with flushing water within the RHCAs. Flushing of these structures outside of the RHCA can only be done if there is no potential for sediment delivery to any defined stream channel. (BMP 15.21)

Estimated Effectiveness: high; this measure avoids the risk of sediment delivery to live streams by not using water as the means to remove sediment when cleaning near stream culverts.

g. If culvert cleaning is conducted with heavy machinery, this machinery shall be used only from the established road prisms. (BMP 14.17)

h. Dispose of materials suspected to contain harmful contaminates such as timber preservatives, red lead, fuel oil, solvents etc. appropriately as required by applicable regulations. (BMP 11.07, 11.11, 15.11)

i. Maintain a packed snow floor and/or utilize shoes on blades, dozers and other snow removal equipment to minimize amount of road surface material placed in snow berms. (BMP 15.24)

j. Do not side cast into or adjacent to streams snow containing significant amounts of dirt, debris or other materials removed from the roadway. This snow may need to be hauled to an appropriate disposal location. (BMP 15.24)

k. Sidecasting of snow should be avoided in areas adjacent to streams where there is potential to cause snow or ice damming. (BMP 15.24)

l. Snow berms left on the shoulder of the road will be removed and/or drainage holes will be opened and maintained. Drainage holes will be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. (BMP 15.24)

m. Snow Removal will adhere to the Standard Forest Service Timber Sale Contract Provisions (C5.316).

n. Road maintenance activities in live water and which generate the potential for instream sedimentation are prohibited from April 1 to July 15th on sites upstream of trout populations and/or spawning areas, namely Gold Gulch and tributaries.

Estimated Effectiveness: high; avoiding the times when native cutthroat trout embryos are incubating in the gravel (highest vulnerability to sedimentation) will minimize the effects that sediment would have if delivered into streams. After young fish have emerged and swim freely, they are much less vulnerable to suffocation and death as a result of sedimentation.

o. When a stream parallels within five feet of a road the brush cutter will be turned vertically to cut only the vegetation growing towards the road and not the vegetation providing canopy to the stream. (BMP 15.12, 15.19)

p. Any soil disturbance adjacent to stream channels shall receive evenly distributed weed free mulch coverage with brush and trees to reduce sheet erosion. Mulch generated during the clearing phase of the rehabilitation work shall be used to the maximum extent practicable. (BMP 15.12, 15.19)

q. Utilize good surface preparation and multiple pass application of chloride products to minimize runoff and promote infiltration of the product. Dust abatement chemicals should be applied shortly after blading (within 1 week). The road should have good moisture content, in order to get the calcium chloride to adhere well to the fines. The purpose of multiple pass application is to avoid spraying off the road, particularly when crossing streams. Chemicals should be applied in a manner that minimizes calcium chloride from running off the road. (BMP 15.22)

r. Drafting rates will be such that no noticeable decrease in wetted width of the stream will occur. Should it be necessary to create a temporary barrier or blockage to the stream (to create a pool deep enough to draft from), during drafting an agency fish biologist will evaluate the site and may identify further mitigation.

Estimated Effectiveness: high; temporary flow diversions, such as drafting, in low-discharge, perennial headwater streams reduce instream flows downstream and could cause intermittent stream dewatering. Short periods of dewatering in fish-bearing streams causes harm and sometimes kill individual fish.

s. If drafting water from fish-bearing streams, prevent injury to small fish during drafting by using either 3/32-inch or smaller mesh intake screens or double rolled 1/8-inch hardware cloth crimped at both ends when drafting water for dust abatement operations.

Estimated Effectiveness: high; unscreened draft hoses can entrain fish through the pump mechanisms, which most often leads to death. Screening the end of hoses prevents fish from being entrained.

t. Adhere to BMP 15.23 Traffic Control During Wet Periods by repairing any failing drainage features on 2642 main road and 2642C road. At the time of implementation there may be additional drainage features along the road network that need to be repaired and incorporated into the Road Package.

Fire, Fuels and Air Quality Design Features

Features Designed for Prescribed Burning

Prescribed burning treatments would be conducted according to established standards in FSM 5142 – Prescribed Fire Management. A site-specific burn plan would be prepared for each area to be burned. Burning would only occur when weather, fuel conditions, and available resources

are at the levels specified in the prescribed burn plan. Site conditions may dictate the use of other fuel treatment methods prior to implementation of the burn in order to prepare for this prescribed fire.

Because post-harvest fuel conditions cannot be completely predicted, assessments would need to be made by a fire/fuels specialist and a silviculturist after completion of harvest activities. A determination would then be made as to whether the burn could be implemented safely and effectively without further fuels treatment, or if some modifications of the fuels ? is required to meet the objectives of the silvicultural prescription.

Estimated Effectiveness: high; burns conducted in compliance with an approved prescribed burn plan have a high success rate (USDA Forest Service 1998. Wildland and Prescribed Fire Management Policy, Implementation Procedures Reference Guide. P. 65.)

Slash and Pile Burning – Landing slash and excavator piles would be burned in late fall after heavy rains and during cooler temperatures when the risk of escape into adjoining stands and damage to residual timber is lessened.

Estimated Effectiveness: high; Decades of burning piles in late fall has proven successful at ensuring there have been no escape fires in the Sandpoint Ranger District (Personal communication with Dave Lux, Fire Management Officer, May 4, 2005).

Fuel Breaks – If natural fuel breaks are not present, fire lines and fuel breaks would be constructed around the perimeters of all burn units. Where possible, fire lines and fuel breaks would be constructed on ridges, benches, and the toe of the slopes, using the advantage of the terrain to best control the fire.

Estimated Effectiveness: high; fuel breaks that follow favorable terrain are more effective in reducing radiant heat and preventing burning debris from crossing fuel breaks (USDA Forest Service 1996. Wildland Fire Suppression Tactical Reference Guide. USDA Forest Service National Wildfire Coordinating Group. P. 20, 24, 32, and 33.).

Use of Water and Engines – Fire hose would be installed along critical sections of fuel breaks using water supplied from fire engines when access is available. An emergency spill clean up kit would be on site in the unlikely event of a spill outside the containment system.

Estimated Effectiveness: high; fuel breaks that are reinforced with water are more effective in keeping fire within the fuel break (USDA Forest Service 1996. Wildland Fire Suppression Tactical Reference Guide. USDA Forest Service National Wildfire Coordinating Group. P. 20, 24, 32, and 33.).

Features Designed to Protect Air Quality

Smoke Management – The Idaho Panhandle Forests is a 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/Idaho State Air shed Group. The procedures used by the Air Shed Group are considered to be the “best available control technology” (BACT) 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 March through November, they work in collaboration with the Idaho Department of Environmental Quality, assisting with any recommendations. During the winter months (December through February) the Idaho Panhandle Forests voluntarily collaborate with the Air shed group. This unit monitors meteorological data, air quality data, and planned prescribed burning and decides daily on whether or not to issue recommendations on burning for the following day.

Each year, a list of all prescribed burning (understory and pile burning) planned for the burning season on the Sandpoint Ranger District is input into a data base administered by monitoring unit before March 1st. Before 11:00 a.m. proposed burns for the next day are inputted into the data base. By 3:00 p.m., the same day the monitoring unit posts any recommendations on a website concerning the next day's burns.

Estimated Effectiveness: high; these procedures limit smoke accumulations to legal, acceptable limits. The District strictly complies with these procedures, and has not incurred any air quality violations (Montana/Idaho Airshed Group. Montana/Idaho Airshed Group Operating Guide. . March 2004.).

Historically, prescribed burning on the Sandpoint 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.

Estimated Effectiveness: high; 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. (National Wildfire Coordination Group. December 2001. Smoke Management Guide for Prescribed and Wildland Fire. p. 143-150)

Features Related to Timing of Activities

Timing of Road Decommissioning or Storage – Unless circumstances change during implementation that would extend the duration of time a road is needed, roads would be put into storage within the following timeframes:

1. Temporary roads or existing road segments proposed for storage that are not needed for post-cutting activities (e.g. fuel treatment) would be put into storage the same season following cutting activities or no later than the following season.

2. Other road segments proposed for storage that are needed for post-cutting activities, such as prescribed burning, would be put into storage within five years of cutting activities or after fuels projects are completed.

Features Related to Vegetation Restoration

Post-cutting Treatments – In regeneration units, fuels treatment would occur within five years following timber cutting or the start of rehabilitation when possible. Site preparation and/or

fuels treatment may include a combination of prescribed burning, underburning, grapple piling and hand piling, depending on post-cutting conditions.

Features Designed to Prevent Noxious Weed Introduction and Spread

1. Noxious weed treatment would be conducted according to guidelines and priorities established in the Sandpoint Noxious Weed Control Project FEIS (USDA 1998b). Methods of control may include biological, chemical, mechanical and cultural. Follow-up treatments and monitoring would be conducted as needed.

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

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

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

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

6. All newly constructed roads, skid trails, landings, fuel breaks or other areas of disturbance (including maintenance on existing roads) would be seeded with a weed-free native and desired non-native seed mix and fertilized as necessary. Areas that are underburned would be evaluated after the burn and seeded and fertilized as necessary.

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

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

Estimated Effectiveness: The above mitigation measures are accepted weed prevention practices developed by public land management agencies and university cooperative extension offices and promoted by weed management organizations across the nation (e.g. Sheley *et al*. 2002, Drlik *et al*. 1998, USDA 2001). The above measures include those required in Forest Service Manual (FSM) 2080 for activities related to timber harvest and roads. They are described in FSM

2981.2- 1a and FSM 2081.2 - 6a, respectively (see project file). Also included are weed prevention practices recommended but not required (see project file).

For new weed invaders, the estimated effectiveness of the above measures is high; the measures are expected to be very effective at preventing establishment of new invaders. According to current research (Hobbs and Humphries 1995), early detection and treatment of infestations before explosive spread occurs can significantly reduce the social cost of weed invasions.

For existing infestations that occur along road rights-of-way, estimated effectiveness is moderate; the measures are expected to be somewhat effective at reducing the spread of these in the project area. For existing infestations that have spread off the road, estimated effectiveness is low. Effectiveness of treatments on National Forest lands could be reduced if adjacent landowners do not treat their weed infestations. Existing weeds and new invaders are also spread by wildlife, winds, water and hikers – the mitigation measures would have no effect on these sources of weed spread.

Features Designed to Protect Rare Plants

A qualified botanist would assist with project layout as necessary to ensure protection of documented rare plant populations and microsites of highly suitable habitat. Any changes to the selected alternative that may occur during layout would be reviewed, and rare plant surveys conducted as necessary prior to project implementation. Newly documented occurrences would be evaluated, with specific protection measures implemented to protect population viability. Such measures could include the following;

- Dropping units from harvest activity
- Modifying unit boundaries to provide adequate buffers around documented occurrences, as determined by the project botanist and based on topography, extent of contiguous suitable habitat for documented occurrences and the type of treatment proposed
- Modifying harvest methods, fuels treatment or logging systems to protect TES plants and their habitat
- Implementing, if necessary, Timber Sale Contract provisions B6.24, Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources; C6.24#- Site Specific Special Protection Measures; and B8.33, Contract Suspension and Modification.

Estimated Effectiveness: high; the measures would protect documented occurrences of the Forest species of concern pine broomrape (*Orobanche pinorum* Geyer) and suitable wet forest microsites that occur in some proposed units.

Features Designed to Protect Soil and Site Productivity

- Use existing skid and forwarder trails where practical. Carefully select trails for the least environmental degradation and optimal efficiency.
- Limit ground-based equipment to 40% slopes or less. Short pitches within these harvest units that are above 40% slope should be line-pulled and/or trees should be directionally-felled.
- Use skyline harvesting systems on steep slopes (greater than 40%). Maximize distance between harvest corridors.

Estimated Effectiveness: high; skyline systems are highly effective when employed correctly, specifically this system drastically reduces compaction and soil displacement. (Niehoff 2002, USDA 2004).

- Conventional tractor/ skid trails should be no closer than 75 feet apart in the summer on dry soils. In the winter on snow or frozen ground, skid trails should be spaced no closer than 50 feet apart.
- Harvester/ forwarder trails should be spaced no closer than 50 feet apart, summer or winter.
- Maintain narrow trails, 10 feet in width or less.
- Grapple-piling should be accomplished from skid trails, forwarder routes or slashed-over harvester routes (slash mats).
- Leave as much slash as is feasible under fuel hazard guidelines. Organic matter helps ameliorate past and present soil impacts. Generally we recommend leaving 7 to 14 tons per acre on dry forest types and 16-33 tons per acre of coarse woody debris on moist forest types. Brown *et al*. (2003) recommends that if woody debris are greater than 6" in diameter, forest managers should leave amounts of woody debris on the high end of these ranges. If the size of the debris is small (less than 6"), strive for the lower end of the suggested range.

Estimated Effectiveness: high; according to Graham *et al*. (1994), Brown *et al*. (2003) and Forest Plan Monitoring Reports (USDA 1998a, 1999a and 2000), this practice is highly effective.

- All equipment should stay on designated trails, with the exception of feller-bunchers and harvesters.
- Where feasible, timber harvesters should place slash in front of the harvest equipment and work on a slash mat.

Estimated Effectiveness: high; according to project monitoring in the IPNF and primary literature, working on a slash mat has proven to be highly effective for reducing compaction and soil displacement (Han 2006; Niehoff 2002; USDA 2001, 2002 and 2003).

- For all ground-based logging, work only when soil is dry, frozen, or snow-packed. Some simplified guidelines for these conditions include:
    - Stop work when you detect trenching or mud. If you can form a fairly strong clod with the soil in the topmost 6 inches, then the site is too moist for work.
    - Winter harvest on Snow or Frozen Soil:

0 inches of frozen soil	Need 10 inches of machine-packed snow.
2 inches of frozen soil	Need 6 inches of machine-packed snow.
4 inches of frozen soil	No snow cover necessary.

Estimated Effectiveness: high; logging on snow and frozen soil is a highly effective method for reducing compaction, rutting, soil displacement and associated issues (Flatten 2003; Philipek 1985).

- If prescribed burning is proposed, wait an interval (at least 6 months) between the thinning and the underburn. This will conserve site nutrient capital; allow fine fuels to decompose and larger fuels to become firmly in contact with the soil, thus lessening their chance of complete combustion.

Estimated Effectiveness: moderate to high; this technique has a high to moderate effectiveness rating based on research and Intermountain Forest Tree Nutrition Cooperative recommendations (Baker 1989, Barber and Van Lear 1984, Edmonds 1987, Garrison and Moore 1998, Laskowski *et al*. 1995, Moore *et al*. 2004, Palviainen *et al*. 2004).

- Broadcast burn when the topmost mineral horizon has moisture content of 25% or greater.

Estimated Effectiveness: high; this practice is highly effective in retaining forest floor organic matter and associated nutrients (Niehoff 1985, Niehoff 2002, USDA 2001, 2002 and 2003).

- Monitor three tractor units (including units 11 and 22) that were harvested using either cut to length or other ground-based harvesting equipment within five years post harvest to evaluate compliance to R1 regional soil guidelines.
- For units 11 and 22, cut to length logging systems are required and must operate on a slash mat. All equipment must operate from skidtrails and slash mats only. Skidtrails spacing shall be spaced no closer than 50 feet.

Features Designed to Protect Wildlife

Wildlife Tree Retention

Design features for the project were developed to ensure the retention and selection of snags at a level and distribution that have been shown to support viable populations of snag associated species.

- Snags and live tree replacements would be retained where opportunities exist in treatment units at levels recommended by scientific literature (Bull *et al*. 1997). Retention objectives

are consistent with published data that suggests that populations of cavity nesters were viable in stands of ponderosa pine and mixed conifer forests that contained about four snags per acre (Bull *et al.* 1997). While these recommendations attempt to emulate historically available snag densities under pre-settlement conditions, it is recognized that current conditions (e.g., long-term fire suppression that has interrupted the persistence of long-lived seral tree species and the subsequent recruitment of larger-diameter snags) may not make it possible to meet these recommendations.

- To following minimum amounts of snags and live tree replacements are to be retained within applicable cutting areas:

  - **Dry forest habitats:** 4 snags and 8 live tree replacements per acre from the largest trees

  - **Moist forest habitats:** 6 snags and 12 live tree replacements per acre from the largest trees

- Selection of snags would emphasize practices that assure a diversity of snag structural classes and the highest probability of long-term retention (Bull *et al*. 1997). The high hazard snags and snags in the advanced stages of decay would not be used to meet retention objectives (Intermountain Forest and Industry Association *et al*. 1995). Retention practices would focus on ponderosa pine, western larch, Douglas-fir and western red cedar, especially veteran or relic ponderosa pine and western larch trees. Trees killed by root disease would be avoided, where possible, to meet retention objectives because of their rapid deterioration and fall-down rate.

- While retention objectives are accounted for on a treatment-level scale, some snags would be represented on every ten acres of treatment, in clusters or clumps where feasible, to promote good distribution of snags. Large diameter snags not designated for removal (greater than 15 inches dbh) that are felled for safety reasons would remain on site to provide for large woody debris recruitment and long-term site productivity.

- Criteria for silvicultural prescriptions would include retention of some larger diameter defective or broken-top trees as live trees for future recruitment. Tree designation guidelines for live tree replacements would favor retention of large diameter trees, particularly hollow and broomed trees except when they pose a safety concern. Western larch, ponderosa pine, and western red cedar greater than 20 inches dbh would be designated as first choices for live tree replacements.

- Slash would be pulled back from veteran or relic ponderosa pine and western larch live trees and snags where needed to protect them from the adverse effects of prescribed burning. Grapple piling would be considered to treat fuels on moderate slopes where residual snags would be at risk from broadcast burning.

Estimated Effectiveness: moderate; this measure would be implemented using project layout, contract provisions, compliance monitoring and fuels treatment, and would have a moderate chance of avoiding and/or reducing adverse effects on snag-associated wildlife. It would not be the intent of this project to willfully remove the high-hazard snags and snags in the advanced

stages of decay ("soft" snags). Some of these "soft" snags would survive and remain standing during the life of the project.

Past monitoring has demonstrated that tree harvesting and subsequent burning removes a large portion of existing snags, especially "soft" snags. However, through strategic placement of leave patches or clumps, adequate numbers of snags within these areas should be relatively protected. In addition, prescribed burning would recruit "new" snags by fire-killing residual green trees. The project would be effective in meeting and exceeding live tree replacement criteria because the vegetative prescriptions are designed to leave ample green trees scattered in patches, individually or uniformly depending on the harvest treatment. Consequently, this measure should provide more than the minimum number of snags and live tree replacements.

Retention of Broadleaf Deciduous Trees

- To maintain forest species diversity and wildlife habitat, aspen and birch trees would not be harvested. If these species need to be cut for safety reasons, they would remain on site for coarse woody debris and long-term site productivity. Selected merchantable conifers in and around aspen patches would be removed to reduce competition for water, nutrients and sunlight.

Estimated Effectiveness: high; this measure has a high potential for being implemented. These measures would be implemented through contract provisions and compliance monitoring. Effectiveness is high because regardless of whether broadleaf trees remain standing or felled for safety reasons, they remain on site and provide benefits to various wildlife species. Trees such as aspen and birch will re-sprout if felled or killed by burning.

Grapple Piling

- In areas where grapple piling is prescribed for fuels reduction, leave one to three slash piles per acre unburned to provide habitat for small forest mammals (snowshoe hare) and forest land birds, except in areas designated as fuelbreaks.

Estimated Effectiveness: high; leaving slash piles unburned would provide replacement habitat for small mammals and land birds in the form of coarse woody debris during the first few years post-treatment.

Dry Forest Ecosystems

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

- Maintaining or creating a relatively open landscape of ponderosa pine/Douglas-fir that is structurally complex with non-uniform spacing of trees and scattered patches of denser vegetation (greater than ¼ acre)

- Promoting the persistence of large snag habitat
- Retaining an overstory canopy closure of 35 to 65 percent
- Fashioning a landscape to accommodate a relatively frequent fire regime

Estimated Effectiveness: high; using silvicultural prescriptions, marking guides, contract inspections and appropriate fuel treatment methods, this feature would have a high likelihood of avoiding or reducing adverse effects to flammulated owl habitat.

Goshawk Protection

- Goshawk nest searches would be conducted during project layout and implementation. A no activity area of 40-acres would be placed around any newly discovered goshawk nest or any nest that has been active in the past five years. If the nest tree is not centered within the 40-acre no activity area, an additional no activity distance of at least 745 feet (the radius of a 40-acre circle) may be implemented between the nest tree and harvest units to reduce impacts to habitat around the nest site from project activities. The District Wildlife Biologist would determine if this additional no activity distance would be implemented based on factors such as topography, the location of the nest tree within the 40-acre nest area and the distance of the nest tree from private ownership and/or existing roads.

- Project activities would be suspended within half a mile of active nest areas from March 15 to August 15 to promote nesting success and provide forage opportunities for adults and fledgling goshawks during the fledgling dependency period. Activity restrictions would be removed after June 30 if the District Wildlife Biologist determines the nest site is inactive or unsuccessful.

Estimated Effectiveness: moderate to high; protection measures would allow continued nesting and successful rearing during and after project implementation (Reynolds *et al*. 1992). The 40-acre no-activity area has been shown to provide an adequate post-harvest nest stand for goshawks. The seasonal restrictions are likely to minimize disturbance to active nests.

Road Design, Skid Trails and Cable Corridors

- To maintain habitat for snag-dependent species and species dependent on large diameter trees, the location of proposed new roads, skid trails and cable corridors will ensure, wherever practical, that veteran and relic fire survivor trees would not be removed.

Estimated Effectiveness: low to moderate; road location is determined to a large degree by FS road construction standards and the local terrain. Cost is also an important consideration. The sale administrator has the authority under the timber sale contract provisions to approve all skid trail and cable corridor locations. However, there are many factors when choosing their location on the ground. Consequently, it is not possible to expect that all veteran and relic trees would be protected by this measure.

Protection of Seeps, Bogs, Wallows and Springs

- All known or discovered seeps, bogs, elk wallows and springs less than one acre in size would be protected with a “no activity” buffer approximately 100 feet.

Estimated Effectiveness: high; this practice would be implemented because it would be incorporated into the project design.

Vegetation Screens

- Intermittent vegetation buffers would be left along the open roads in Units 4, 7, 8c, 10, 12a, 18, 19 and 22 to provide security screening for wildlife and minimize unauthorized access into these stands. Buffers would be approximately 100 to 200 feet, depending on the type of cover and topography and would transition from a no-cut zone along the road into the treatment prescription.

Estimated Effectiveness: moderate; using specific silvicultural prescriptions and marking guides, this feature would have a high likelihood of being implemented to achieve desired objectives where creating buffers is feasible.

Threatened, Endangered and Sensitive Wildlife Species Management

- If any threatened, endangered, or sensitive species were located during project layout or implementation, management activities would be altered, if necessary, so that proper protection measures can be taken. Timber sale contract provision, Protection of Threatened, Endangered and Sensitive Species, would be included in any timber sale contract.

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

Road and Skid Trail Access

To prevent establishment of motorized public use patterns on temporary roads, new permanent roads to be placed into storage after project activities, and existing, undrivable roads that are opened for project activities:

- When roads are first constructed or reopened prior to use for the project, they would be closed to public motorized use with a gate or other effective closure device.

- Once project activities start, the roads would remain closed to public use with a gate. Gates would be closed at the end of each day's use, during periods of inactivity, on weekends and on holidays.

- After completion of project activities, the roads would remain closed to public motorized use with a gate or other effective closure device until the road is decommissioned or put into storage.

- Decommissioning or storage activities would occur as soon as possible after completion of project activities including planting and fuels treatment.

- All existing and created skid trails that might provide motorized access from open roads would be closed with large mounds made up of a combination of slash and dirt to help reduce the attraction to use of these trails.

Estimated Effectiveness: high; these measures would eliminate or reduce adverse impacts to wildlife by controlling motorized access on roads. Under contract provisions, administration of contract provisions and compliance monitoring these measures would be implemented.

Features Designed to Protect Visual Resources

The following design features would be utilized during project implementation to minimize impacts to visual resources:

- If hazardous fuel treatment units can be viewed from travel corridors and require pruning, trees should be pruned at uneven heights. A variety of tree heights, sizes, and species should be maintained.
- Unit boundary and designated tree markings should not be permanently visible from travel corridors or developed recreational trails.
- Following sale activities, residual unit boundary signs, marking, and flagging should be removed adjacent to travel corridors, private land boundaries and public facilities. Any marking paint visible from the travel corridors or designated trails should be covered over with paint blending in with the bark of the tree.
- Unit shapes and sizes should be blended into past treatment areas, as well as natural vegetation and geologic features. In addition, leave trees should be spaced and clumped irregularly to provide visual variety.
- As many overstory trees as possible should be left on each side of gates or closure devices to provide screening and improve access security.
- Where feasible, edges of units should be feathered, by retaining more residual trees, so the transition from treated to untreated stands is not abrupt.
- Power lines should be screened when feasible.
- Stump heights in units that can be seen from travel corridors, trails, private land boundaries, and public facilities should be no higher than 6 inches.
- Forest residues should be cleaned up 50 – 100 feet from travel corridors, trails, private land boundaries, and public facilities to maintain visual character.

Features Designed to Protect Recreation Resources

The following design features would be utilized during project implementation to minimize negative impacts to recreational users as well as developed recreation features.

Gold Hill ATV Trail #2 and the Trailhead on Road 2642

- No ground based equipment (either harvesting or grapple-piling) within 75 feet on each side of the trail centerline to prevent ground disturbance and the appearance of other trails.

- Handwork and/or line-pulling would be allowed within the 75-foot buffer where equipment cannot reach the trees.

- If crossing the trail is necessary with equipment, locations would be designated on the ground and approved by the Sale Administrator and crossings would be limited in number to help reduce resource damage to the trail. Crossing would be rehabilitated immediately adjacent to the trail (scattered with slash, berms eliminated), and trail tread would be reconstructed to its original constructed width of 48" wide and no wider. All logging-created slash will be removed from the trail.

- Trees shall be directionally-felled away from the trail to minimize negative effects to the trail tread.

- Public safety would be a critical element of this project. The trail would be closed to the public during active logging operations adjacent to or affecting the trail. Due to the high use and popularity of this trail the length of the closure shall be kept to a minimum and the trail should be opened once logging operations have finished and the trail has been restored. A Forest Closure Order is needed to close or restrict use on the trail.

- Unit 11 includes sections of Trail #2. To avoid conflicts with trail users, no logging operations shall occur during the peak summer season (Fourth-of-July through Labor Day) within unit 11, unless otherwise agreed to by the Forest Service Representative (FSR).

- Stumps within the 75-foot buffer adjacent to the trail would be flush cut no higher than 6" from the ground.

Gold Hill Trail #3 and the Trailhead on Road 2642

- No ground based equipment (either harvesting or grapple-piling) within 75 feet on each side of the trail centerline to prevent ground disturbance and the appearance of other trails.

- Handwork and/or line-pulling would be allowed within the 75-foot buffer where equipment cannot reach the trees.

- If crossing the trail is necessary with equipment, locations would be designated on the ground and approved by the Sale Administrator and crossings would be limited in number to help reduce resource damage to the trail. Crossing would be rehabilitated immediately adjacent to the trail (scattered with slash, berms eliminated), and trail tread

would be reconstructed to its original constructed width of 30”, no wider. All logging-created slash will be removed from the trail.

- Trees shall be directionally-felled away from the trail to minimize negative effects to the trail tread.

- Public safety would be a critical element of this project. The trail would be closed to the public during active logging operations adjacent to or affecting the trail. Due to the high use and popularity of this trail the length of the closure shall be kept to a minimum and the trail should be opened once logging operations have finished and the trail has been restored. A Forest Closure Order is needed to close or restrict use on the trail. This closure would need to be well advertised and posted at the trailheads.

- Units 21, 25, 28 and 32 are located adjacent to or could affect sections of Trail #3. To avoid conflicts with trail users, no logging operations shall occur during the peak summer season (Fourth-of-July through Labor Day) within units 21, 25, 28 and 32, unless otherwise agreed to by the FSR.

- Stumps within the 75-foot buffer adjacent to the trail would be flush cut no higher than 6 ” from the ground.

General Project Area

- Closure/warning signs would be posted both at the 2642 Road Entrance, as well as at trailheads for Trails #2 and #3, to deter public use during active logging/hauling operations.

Features Designed to Protect Heritage Resources

- If the presence of a cultural resource site is identified prior to implementation of operational activities, mitigation measures could include:
    - dropping the proposed activity unit;
    - modifying the proposed activity, and/or;
    - implementing buffers around the point of concern.

Estimated Effectiveness: Very high

Features Designed to Protect Forest Vegetation Resources

- **Retention of Large Old Trees in Stands Not Designated as Old Growth –** Within some units there are portions of stands (<25 acres) with individual and/or groups of large old trees that are not defined as old growth. Silvicultural prescriptions and marking guidelines would specify that these trees be retained.

- **Retention of Untreated Vegetation in Treatment Areas -** Pockets, stringers, and islands of untreated vegetation would be left untreated in stands where harvest is proposed. These areas would contribute to both structural and compositional diversity, break-up fuel and vegetation mosaic continuity, and blend openings into the surrounding landscape making harvest units appear more natural. Additionally, by leaving untreated areas within and between more open (less vegetated) areas, none of the openings would exceed 40 acres.
- **Monitoring for Regeneration Success -** All regeneration cutting units would be monitored for regeneration success the first, third (and fifth year if necessary) following planting; as required under NFMA.

General Project Design Features

- Coordination with the State of Idaho and Bonner County would occur for access points and road mitigation work needed on either state or county roads. All temporary roads constructed in conjunction with the project would be fully obliterated following use in accordance with the Area Road Management Plans and the IPNF Forest Plan. Existing roads, which are currently restricted and utilized for this project, would be returned to their pre-project road status.